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Exploring Healthcare Services Utilization and Medication Adherence of the Arab Descent Americans in South Florida

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EXPLORING HEALTHCARE SERVICES UTILIZATION AND MEDICATION ADHERENCE OF THE ARAB DESCENT AMERICANS IN SOUTH FLORIDA

By

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A dissertation submitted in partial fulfillment of the requirements for the degree of
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CERTIFICATE OF APPROVAL

Ph.D. Dissertation

This is to certify that the Ph.D. Dissertation of

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With a major in Pharmaceutical Sciences with a specialization in Social and Administrative Pharmacy has been approved by the Examining Committee on July 28, 2020 as satisfactory for the dissertation requirement for the Doctor of Philosophy degree

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CERTIFICATION

We hereby certify that this dissertation, submitted by Haifa Abdulrahman Fadil, conforms to acceptable standards and is fully adequate in scope and quality to fulfill the dissertation requirement for the Doctor of Philosophy degree.

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ABSTRACT

An Abstract of a Dissertation Submitted to Nova Southeastern University in Partial Fulfillment of the Requirements for the Degree of Doctor of Philosophy

EXPLORING HEALTHCARE SERVICES UTILIZATION AND MEDICATION ADHERENCE OF THE ARAB DESCENT AMERICANS IN SOUTH FLORIDA

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Research into health outcomes of Arab-descent Americans (ADAs) is sparse. ADAs identify as "White," instead of in a separate census category, contributing to their underrepresentation in the census and the limited amount of research on their health outcomes. In the current U.S. sociopolitical climate, better understandings are needed of the impact of discrimination and Arabic culture, including level of health literacy, on ADAs' general health and health outcomes. This study employed mixed methods to explore the impact of health literacy level and perceived discrimination on HSU and medication adherence for ADAs in South Florida. In its qualitative phase, a convenience sample of 27 eligible participants was recruited in nonclinical settings using snowball sampling. Study participants were divided into three focus groups led by a moderator. In the quantitative phase, a cross-sectional online self-administrated survey was utilized to collect data on 210 eligible ADA participants. Binary and hierarchical logistic regression analyses were used to identify predisposing, enabling, and needs factors associated with HSU and medication adherence. Qualitative findings provided detailed descriptions of factors impacting ADAs' health status. Six minor subcategory themes emerged: characteristics of Arabic culture, access to healthcare and insurance, health literacy, perceived discrimination, reactive attitudes toward physical health, and mental health stigma. The quantitative phase revealed that 68.6% of participants reported outpatient visits, 31.4% preventive care utilization, and 25.2% an optimal medication adherence level. The final model of the hierarchical logistic regression indicated that ADAs who had U.S. parents were less likely to have outpatient visits, whereas those having high income, health insurance, adequate health literacy level, or multiple illnesses were more likely. Women, older, and insured participants were more likely to utilize preventive care. Age, beliefs about medicines, lack of health insurance, and physical quality-of-life variables were significant predictors of optimal medication adherence. The synergy resulting from the interplay of both data sources revealed numerous factors influencing HSU and medication adherence, among which perceived discrimination, health literacy, health insurance knowledge, and beliefs about medicines can be alleviated by promoting cultural competency in healthcare and pharmacy practice to overcome health disparities and improve access to high-quality healthcare services for ADAs.

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DEDICATION

I dedicate this degree to my dearest family.

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I love you all so much!!

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LIST OF ABBREVIATIONS AND SYMBOLS

AAHLS	Test of All Aspects of Health Literacy Scale
ABM	Andersen's Behavioral Model
ACA	Affordable Care Act
ADAs	Arab Descent Americans
AMA	American Medical Association
BAI	Beck Anxiety Inventory Scale
BMQ	Beliefs About Medicines Questionnaire
BRFSS	Behavioral Risk Factor Surveillance System
CES-D	Center for Epidemiological Studies Depression Scale
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular Diseases
DAAS	Detroit Arab American Study
ED	Emergency Department
EDS	Everyday Discrimination Scale
HCV	Hepatitis C Virus
HIV	Human Immunodeficiency Virus
HSU	Healthcare Services Utilization
IOM	Institute of Medicine
IRB	The Institutional Review Board
MCS	Mental Component Summary
MENA	Middle East and North African

MMAS-8	Morisky Medication Adherence Scale-8
MS	Mammography Screening
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey
NVS	Newest Vital Sign
OR	Odd Ratios
PCS	Physical Component Summary
PTSD	Post-Traumatic Stress Disorder
REALM	Rapid Estimate of Adult Literacy in Medicine
SBSQ	Chew's Set of Brief Screening Questions
SCBRFS	Michigan Special Cancer Behavioral Risk Factor Survey
SF-12v2	Short Form Health Survey Version 2
SRH	Self-Rated Health
TOFHLA	Test of Functional Health Literacy in Adults
WHO	The World Health Organization

Chapter 1

Introduction

Over the past few decades, increased incidence of disparities in health outcomes by race and ethnicity has drawn particular attention in the healthcare field in the United States, to the point that these disparities have become an overriding issue in the United States (Alcalá & Cook, 2018). As a result, numerous efforts have been made by public health to reduce disparities and achieve health equity for all (Healthy People 2020, 2019). Despite the fact that health outcomes among comparative racial and ethnic groups in the United States have been addressed, the health of Arab-descent Americans (ADAs) has been ignored at the national level.

This chapter provides background information on ADAs, lists factors that could influence their health, such as perceived discrimination and health literacy, and describes vital health outcomes such as healthcare services utilization (HSU) and medication adherence. The research goal and objectives are described, as is the significance of the study.

Arab-Descent Americans in the United States

Arabs began settling in the United States as early as the 1800s, and their number has continued to expand ever since. ADAs are diverse in terms of their time of immigration to the United States and their national, religious, educational, and professional backgrounds. Over the years, different waves of Arab immigrants have

arrived in the United States. Early immigrants came from rural areas and had very little formal education. They worked long, hard hours in labor-intensive jobs such as peddling. A second wave came after World War II, this time of highly educated Arabs. Some came as students to obtain college degrees and then remained in the United States. The last wave of immigrants came after the U.S. government changed its immigration laws in 1965. Its members were the most diverse in terms of country of origin, religion, and socioeconomic status. Beyond highly educated professional immigrants, they included a high percentage of war refugees and asylum seekers. Despite this diversity, ADAs do share a language and cultural heritage that give them a shared ADA identity (Arab American National Museum, 2009).

An estimated 3.5 million ADAs reside in the United States (Arab American Institute, 2018), claiming ancestry in one or more of the 22 Arabic-speaking countries of the Middle East and North African (MENA) region (Amer & Awad, 2015). They include first-generation immigrants, U.S.-born children of immigrants (1.5 and 2nd generations), or children born in the United States to U.S.-born parents (3rd generation and beyond; Abuelezam et al., 2018). Most ADAs in the United States are native-born, with 82.0% claiming citizenship, and have ancestral origins in Lebanon, Egypt, Syria, Palestine, Morocco, Iraq, Jordan, or Yemen (Arab American Institute, 2018; U.S. Census Bureau, 2016). However, due to the political instability of the MENA region, ADAs are disproportionately represented among recent immigrants to the United States. The estimated number of ADAs in the United States could be higher than the actual number reported in light of the increasing numbers of asylum seekers and refugees seen today (Abuelezam et al., 2018). About two-thirds of all ADAs live in 10 states: California,

Michigan, New York, Florida, Texas, New Jersey, Illinois, Ohio, Pennsylvania, and Virginia. Although the highest concentration of ADAs is in Michigan, the largest population is in California (Arab American Institute, 2018). Interestingly, however, in 2015 Florida was recognized as the state with the fourth-highest population of ADAs, with a majority residing in Miami–Dade and Broward counties. The members of the Florida population who identified themselves as having Arabic-speaking ancestry on U.S. Census surveys grew by more than 45.0% between 2000 and 2013 (Arab American Institute, 2018).

ADAs are more educated than the average American: 49.0% have a bachelor's degree or higher, compared with 32.0% of Americans at large. Roughly 20.0% of ADAs have a postgraduate degree, approaching twice the U.S. average of 12.0% (Asi & Beaulieu, 2013). The median income for ADA households in 2018 was $60,398, near all households' national median income of $63,688. The labor force of ADAs is similar to the national average (62.88%), with about 61.0% of ADAs in the labor force and 6.0% unemployed. Approximately 45.0% of working ADAs are employed in managerial, professional, technical, sales, or administrative fields. Most ADAs work in the private sector (82.0%), but 10.0% are government employees (Arab American Institute, 2018).

The ADA community has been negatively portrayed in U.S. media over the past few decades (Abuelezam et al., 2017), yet very little is known about the influence of ADAs' culture, which encompasses the interplay of religion, culture, and ethnicity, on their health status. Knowledge is also limited regarding the burden of adverse health outcomes and the potential for health disparities concerning ADAs (Abuelezam et al., 2018). ADAs' identification as "White," instead of having a separate category, is a

contributing factor to their underrepresentation in the U.S. census as well as to the limited amount of research into their health outcomes.

Like for any other minority in the United States, ADAs' health status is impacted by a vast array of social determinants of health. For ADAs, major social determinants that affect health include access to healthcare services, recent immigration, the effects of cultural and religious behavioral norms, health literacy, perceived discrimination challenges in assimilation and acculturative stress, and marginalization of the community due to increased media attention (Amer & Awad, 2015; Ghoneim & Vyas, 2012). To provide a platform for creating and implementing needed interventions for ADAs, better understandings are needed of the stigma associated with this ethnic group and of how forms of discrimination and stereotypes may impact individuals' general health status and health outcomes, such as healthcare services utilization (HSU) and medication adherence. To address this lacuna in the literature, this dissertation explores health literacy and perceived discrimination and their effects on HSU and medication adherence outcomes for ADAs in South Florida.

Perceived discrimination could lead to health disparities among ADAs, which have been found to affect their health status (Padela & Heisler, 2010). Evidence indicates that perceived discrimination influences health behaviors, including proper HSU and medication adherence, by reducing social, emotional, and physical resources (Benjamins, 2012). Numerous studies have implied that perceived discrimination due to race and ethnicity leads to poorer mental, emotional, and physical health and contributes to suboptimal use of HSU, including cancer screening, pharmacy services, and needed

medical and mental healthcare (Alcalá & Cook, 2018; Benjamins & Whitman, 2014; Paradies et al., 2015).

After Muslim terrorists attacked New York City and Washington, D.C., on September 11, 2001, ADAs in the United States have experienced a heightened level of societal stressors. Ethnically based harassment, perceived discrimination, and hate crimes may have increased the risk of psychological distress in this community (Amer & Awad, 2015; Amer & Hovey, 2012). Furthermore, the negative sociopolitical climate surrounding ADAs during the 2016 presidential campaign has contributed to record numbers of reports of discriminatory incidents and hate crimes committed against this marginalized group (Lichtblau, 2016). A better understanding of the impact of perceived discrimination on ADAs' health outcomes, such as HSU and medication adherence, is thus needed to reduce disparities in health outcomes and ensure access to high-quality healthcare services.

Additional factors that could influence ADAs' health include their level of health literacy. Limited health literacy has been found among those who have lower education levels, racial and ethnic minorities, the uninsured and publicly insured, and the elderly. Individuals who have limited levels of health literacy experience several challenges, such as communicating with healthcare teams, interpreting numbers or risks while making a healthcare choice, using available health resources, and understanding health information. Specifically, ethnic minorities who have a low level of health literacy may lack accessible written resources in their primary language and may be unfamiliar with the healthcare system (Greenhalgh, 2015; Liang & Brach, 2017; Rikard et al., 2016). According to the Institute of Medicine, health literacy is the ability of individuals to obtain available health

information. They should be taught how to communicate, use, and process basic health information so that they can make appropriate health decisions. Individuals who are unable to understand or who only partially understand basic health information are more likely to make poor health decisions, including by misinterpreting health information; seeking primary care from the emergency department; decreasing their utilization of preventive care; and having difficulty understanding medication instructions, adhering to treatment, or struggling with the management of chronic diseases (Miller, 2016). As the number of Arab immigrants in the United States grows, inadequate health literacy levels could have an impact on ADAs' health outcomes (Arab American Institute, 2018).

This research explores patterns of HSU and medication adherence outcomes for ADAs, vital health outcomes that can be influenced by history, culture, family experience, and individual preferences. Racial and ethnic disparities in HSU are well documented in the literature (Artiga et al., 2017; Fiscella & Sanders, 2016; Martino et al., 2019; VanderWielen et al., 2015). HSU includes the use of healthcare services to prevent and cure health problems, promote maintenance of health and well-being, or obtain information about health status and prognosis (Carrasquillo, 2013). As an important indicator of health outcomes that affect the overall health status, HSU is a foundation of health policy and a surrogate measure for access, particularly among minorities; thus addressing this outcome is important to minor populations such ADAs whose members are underserved or hard to reach from a sampling perspective (Dukhanin et al., 2018; Ngwakongnwi, 2017).

Medication adherence is another health outcome that could be affected by health dipartites among ADAs. The World Health Organization (WHO) has defined medication

adherence as “the extent to which the persons’ behavior (including medication-taking) corresponds with agreed recommendations from a healthcare provider” (Lam & Fresco, 2015). However, multifactorial barriers hinder medication adherence behavior, among them patient-related factors (e.g., age, gender, race, ethnicity) and socioeconomic factors (e.g., education, income, health literacy; Devine et al., 2018; Zullig & Bosworth, 2017). Evidence indicates race and ethnic disparities in adherence to prescribed medication regiments (Wilson et al., 2016; Xie et al., 2019). Unlike for other ethnic minorities, research into medication adherence research for ADAs is still in its infancy. Few studies have reported medication adherence levels among ADAs or factors that could affect their adherence. In addition, several studies have identified conditions and illnesses that are particularly prevalent among ADAs, including cardiovascular disease (CVD) (Al Suwaidi, 2016; Jamil et al., 2008), diabetes (Al-Dahir et al., 2013; Fritz et al., 2016), posttraumatic stress disorder (PTSD), depression (Jaber et al., 2015), asthma, cystic fibrosis, birth outcomes, and cancer (Abuelezam et al., 2018; El-Sayed et al., 2011). Many of these health issues benefit from adherence to medication or therapies.

Perceived discrimination and level of health literacy have been shown to adversely affect a broad range of health outcomes, such as HSU and medication adherence. These factors place ADAs at risk for health disparities and thus require targeted attention outside the general population. These factors warrant the collection of health data and the use of study opportunities to develop initiatives for serving the specific health needs of ADAs.

Significance

ADAs constitute a growing and increasingly important segment of American society, yet minimal research is available regarding their health status. Overall, the relationship between perceived discrimination and the health of ADAs, within the current U.S. sociopolitical climate, remains underexplored. This significant lacuna in the literature calls for understanding of the effects of perceived discrimination and health literacy on ADAs' health to effectively assess and treat their health concerns. To clearly understand the overall health status and well-being of ADAs, I employ a thorough mixed-method approach. In this study, I also explore the risk factors that influence and predict HSU and medication adherence in this population.

This study adopts an innovative approach by applying Andersen's Behavioral Model (ABM), not previously used in the limited research available on this marginalized population. Applying ABM will provide a deeper understanding of the current health outcomes and well-being of ADAs. This behavioral model emphasizes factors that influence health outcomes, such as HSU and medication adherence. Although many of these factors are similar across populations, some ways in which they interact and influence the actions of individuals may be unique to ADAs, with level of health literacy and current level of perceived discrimination impacting HSU and level of medication adherence (Benjamins, 2012; Fazeli Dehkordy et al., 2016; Mouton et al., 2010). Multifactorial interaction has not yet been explored among ADAs. The results of this study will inform practitioners of health risks that face ADAs and encourage research that can address unanswered questions about health outcomes for this marginalized group.

Research Objectives

This study uses a mixed-method approach to expand knowledge about ADAs' health status and make a robust contribution to the limited body of literature on this group's health. Additionally, this research is intended to offer new understandings of the roles of health literacy and perceived discrimination, as well as their effects on HSU and medication adherence among ADAs in South Florida. Finally, it explores the suitability of the ABM for application to an understudied population.

Chapter 2 reviews the relevant literature on ADAs' health and the roles of health literacy level and perceived discrimination in HSU and medication adherence. In addition, it presents literature about the ABM theoretical framework. Chapter 3 describes the methodology used—a cross-sectional quantitative design with a nested qualitative component. Chapter 4 presents the results of both phases, qualitative and quantitative. Finally, Chapter 5 discusses the obtained results, offers the main conclusion, identifies limitations of the study, and offers recommendations for further research.

Summary

This research explores health literacy level and perceived discrimination as well as their effects on HSU and medication adherence outcomes for ADAs in South Florida. Research into the health outcomes of individuals of ADAs is sparse. In the current U.S. sociopolitical climate, better understandings are needed of the discrimination associated with this ethnic group, allowing healthcare providers to discern the impact of discrimination on general health status and health outcomes, such as HSU and medication adherence. Furthermore, health literacy level has been shown to adversely affect a broad range of health outcomes, such as HSU and medication adherence. These factors place

ADAs at risk for health disparities and thus require targeted attention. The findings of this study, both qualitative and quantitative, should yield important information for constructing epidemiological data regarding ADAs' health outcomes. In addition, the synergy resulting from the interplay of both data sources should make a novel contribution to current understandings of ADAs' health outcomes and advance the current health and pharmacy research literature.

Chapter 2

Literature Review

This chapter reviews the literature related to ADAs' health and assesses the strengths and limitations of related studies. A comprehensive review of the medical and public health literature in English and published prior to 2020 was conducted using search terms describing ADAs' health outcomes and behaviors. The resulted literature is presented chronologically.

First, use of Andersen's Behavioral Model (ABM) as the framework for this dissertation is discussed. Second, health status among ADAs is explored. Third, studies investigating the role of health literacy among ADAs are reviewed. Fourth, studies that have examined the effects of perceived discrimination among ADAs are evaluated. Fifth, ADAs' medication adherence is addressed. Sixth, healthcare services utilization (HSU) studies, including preventive, mental, and general utilization, are summarized. Seventh and last, gaps in the literature are identified.

Theoretical Model Andersen's Behavioral Model (ABM)

To explain factors that could be associated with HSU and medication adherence, the ABM was employed as a guiding theoretical framework in this study. Developed in 1968 to explain access to HSU at the individual level (Andersen, 1968), the ABM has been widely used as a theoretical framework to predict HSU (Brzoska et al., 2017; Finlayson et al., 2010; Fleury et al., 2014; Han & Redlich, 2018; Hirshfield et al., 2018;

Kaylor et al., 2010; Kim et al., 2010; Park et al., 2013; Plow et al., 2010; Stein et al., 2012). Although the model was originally developed to predict HSU, it can also be used to predict medication adherence (Andersen, 1995; Briesacher et al., 2011; De Smet et al., 2006; Holtzman et al., 2015; Murray et al., 2004; Surbhi, 2016; Unni, 2008). Furthermore, this model has been applied to a vast array of HSUs, including mental health services, outpatient medical services, alcohol treatment, home healthcare services, and occupational therapy services. It has also been used in different racial and ethnic populations as well as in the treatment of a variety of diseases and conditions, including those relating to mental health, skin disease, HIV, and dental care (Finlayson et al., 2010; Fleury et al., 2014; Holtzman et al., 2015; Kaylor et al., 2010; Kim et al., 2010; Park et al., 2013; Plow et al., 2010). In addition, this model has been used among vulnerable populations, such as homeless adults, immigrants, and refugees, to identify the particular challenges they face in obtaining needed services (Brzoska et al., 2017; Han & Redlich, 2018; Haughton, 2012; Kim et al., 2010; Park et al., 2013; Stein et al., 2012; Yang & Hwang, 2016).

The original ABM was established to predict families' utilization of healthcare services (Andersen, 1968). In later works, the model focused on access to HSU as an outcome of a decision made by individuals, driven by their position in society and the availability of healthcare services (Andersen, 1995; Babitsch et al., 2012). It focuses on the individual as the unit of analysis and measures the joint impact of components in the perspective domain of the model. The entire model can demonstrate the process of HSU and health behaviors, as well as each aspect—including predisposing, enabling, and need factors—that independently affects predictions of HSU and behavior such medication

adherence (Andersen & Newman, 2005; Andersen, 1995; Babitsch et al., 2012; Benjamins, 2012; Gelberg et al., 2000; Hoerster et al., 2011; Stein et al., 2007).

Predisposing factors are factors that exist prior to illness and that shape attitudes toward HSU (Andersen, 1995). These include demographics (age, gender, religion), social factors (education, occupation, and ethnicity), and a person's health beliefs. They mediate the HSU and medication adherence outcomes but are not directly responsible for these outcomes. For example, people in different age groups have different types and degrees of illnesses and consequently have different patterns of HSU and medication adherence (Andersen, 1995; Babitsch et al., 2012; Bustamante et al., 2012; Gelberg et al., 2000; Kim et al., 2010; Lo & Fulda, 2008). Beliefs regarding medications were considered one of predisposing factors in this study, having been identified as a significant predictor for medication adherence outcomes (Holtzman et al., 2015; Hwa Yeon Park, Sin Ae Seo, Hyeyoung Yoo, & Kiheon Lee, 2018; Xie et al., 2019).

Enabling factors include barriers to care and resources that promote or inhibit HSU and medication adherence. These include personal factors such as income, access to care, and health insurance, which are predictive factors of HSU and medication adherence (Andersen & Newman, 2005; Andersen, 1995; Benjamins, 2012; Bustamante et al., 2012; Gelberg et al., 2000; Lo & Fulda, 2008). Other enabling factors that are perceived barriers to obtaining optimal HSU and medication adherence, such as level of health literacy and perceived discrimination, were selected for this study, as they could impact the target population.

The role of health literacy level, first introduced by Lipkus and Peters's (2009) medical decision-making framework was adapted to include health literacy, particularly

the numeracy component within ABM (1995) enabling factors. This framework for medical decision-making connects the roles of numeracy in health literacy, relevant factors, and heath decision/behavior outcomes in a theoretical sequence and illustrates their interactions. Another study conducted by Holtzman et al. (2015) used the ABM as a framework for identifying barriers to and facilitators of HSU and medication adherence among patients who had HIV, with the researchers considering health literacy level to be one factor impacting the study outcomes. A recent nationwide study used the ABM to examine the role of health literacy level, specifically the numeracy component, in preventive HSU (Yamashita et al., 2018). The findings suggested that health literacy level may be more relevant for long-term than short-term risk assessments in determining preventive HSU (Yamashita et al., 2018). A further study used ABM as a framework for HSU to examine the influence of acculturation and health literacy level on cancer screening behaviors among older Chinese Americans, among whom higher health literacy levels were found to be associated with an increased likelihood of lifetime and current cancer screening (Li et al., 2018).

As current sociopolitical issues antagonize ADAs, perceived discrimination is considered one of the enabling factors that may be a barrier to the study outcomes. Several previous studies incorporated level of perceived discrimination within the ABM model. The most common finding indicated that experiences with discrimination were associated with delays in seeking HSU, delays filling a prescription, and poor adherence to medication and medical care recommendations (Alcalá & Cook, 2018; Bazargan et al., 2005; Benjamins, 2012; Casagrande et al., 2007; Jaffee et al., 2016; Lamkaddem et al., 2012; Oser et al., 2016).

Finally, need factors in the ABM model represent an individual's illness or impairment that necessitates HSU and medication adherence. These factors include people's view of their own well-being and functioning status; experience of illness, pain, or health concerns; and view of whether their issues are of sufficient significance and severity to seek professional assistance (Andersen & Newman, 2005; Andersen, 1995; Babitsch et al., 2012; Stein et al., 2012).

Although new versions of ABM address the lack of consideration for environmental interactions as a predictor of proper HSU, the model has traditionally ignored these aspects (Aday & Andersen, 1974; Gelberg et al., 2000; Scheppers et al., 2006; Stein et al., 2012; Yang & Hwang, 2016). These components have not been selected for this study, for the focus here is on individual determinants of HSU and medication adherence, not on measures of healthcare systems or a person's satisfaction with care or medication. In addition, considering the limited work done in this field on ADAs, the ABM constructs selected to guide the current investigation were purposefully selected. Thus this study applies ABM to explain and explore the impact of many factors, particularly health literacy level and perceived discrimination, on HSU and medication adherence among ADAs in South Florida.

Health Status Among ADAs

A major obstacle to research on ADAs is how the U.S. Census Bureau defines ethnicity and race. Individuals from MENA are currently classified as "White," a racial group that also combines European immigrants, leading to imprecise quantification. Despite the obscurity of data regarding ADAs' health status, owing to their lack of classification as a separate ethnic group given their ancestral origin, evidence has shown

that health disparities exist for ADAs and that they disproportionately suffer from health conditions such as diabetes, cardiovascular disease, cancers, and mental health problems caused by both genetic and environmental factors (Amer & Awad, 2015; Dallo & Kindratt, 2016; Dallo et al., 2016; El-Sayed et al., 2011). Furthermore, as for any other racial or ethnic group in the United States, several contributing factors, or health determinants, distinguish ADAs' need and ability to access and use healthcare services. These factors include cultural beliefs and practices, gender roles, health-seeking behavior, discrimination, health literacy, low employment rates, access to care, immigration status, challenges of assimilation and acculturative stress, diet changes and restrictions, and tobacco use. Collectively, all these factors indicate that ADAs are an at-risk population for health disparities, requiring targeted research attention.

A recent comprehensive literature review on ADAs' health yielded 247 articles (Abuelezam et al., 2018). The authors found discussion of certain common health behaviors in these studies: tobacco use, physical activity, alcohol and drug use, and vaccination. They also found that ADA articles focused on seven morbidity clusters for health outcomes: diabetes, mental health, women's and child health, cancer, cardiovascular disease, infectious diseases, and asthma. Among ADAs' countries of origin in these articles (N = 247), Somali immigrants and their descendants in the United States (n = 66, 27.0%) were the largest immigrant subgroup, with Iraqi immigrants (n = 39, 16.0%) the second largest. Almost half of all reviewed studies assessed the health of a mix of countries of origin or did not specify the composition of the groups they included (n = 122, 49.0%). Most of the conducted studies used cross-sectional methods (n = 196, 79.4%) as well as traditional qualitative methods such as focus groups (n = 77, 31.0%).

The authors reported an increase in the number of studies testing interventions (*n* = 15, 6.0%) and the number of longitudinal studies (*n* = 30, 12.0%) since the most recent review, in 2009. Studies of the risk of diabetes, cardiovascular disease, and cancer among ADAs have also increased in number since the most recent review (Abuelezam et al., 2018). Overall, the authors mentioned that research into ADAs' health status research indicates a dearth of community-based programs designed to address ADA's specific social determinants and concerns related to assessing their healthcare needs and achieving better health outcomes.

Health Literacy Among ADAs

In the past two decades, health literacy research has proliferated, giving rise to many definitions and measures with which to capture its domains. The most frequently cited definitions of health literacy were those proposed by the American Medical Association (AMA), Institute of Medicine (IOM), and World Health Organization (WHO), which share an emphasis on individual capacities to access, understand, and use health information and services so as to make appropriate health decisions (Wang et al., 2013). Health literacy level is a pivotal element in health evaluations and is considered the sixth vital sign, along with temperature, pulse, respiration, blood pressure, and pain level (Heinrich, 2012).

Limited health literacy levels have been related to poorer health outcomes and lead to health disparities (Mantwill et al., 2015; van der Gaag et al., 2017). They are prevalent among those with lower education levels, racial and ethnic minorities, the uninsured and publicly insured, and the elderly (Berkman et al., 2011; Rikard et al., 2016). People who have limited health literacy levels have greater HSU and expenditures,

and they spend more on medical prescriptions (Rasu et al., 2015). A study of a nationally representative sample found that levels of health literacy among different ethnic groups (Black vs. Hispanic vs. White) significantly impacted the outcomes of self-related health status and different types of preventive HSU (Bennett et al., 2009). In addition, limited health literacy levels and suboptimal medication adherence were more prevalent in racial or ethnic minority groups than Whites (Osborn et al., 2011). In previous work, HIV medication adherence suggested that level of health literacy mediated racial differences in adherence to anti-retroviral treatment (Waldrop-Valverde et al., 2009; Waldrop-Valverde et al., 2010).

Among ADAs, only a limited number of studies considered the impact of health literacy level on health-related outcomes. In one of the limited interventional studies, Arshad (2011) evaluated knowledge and literacy related to breast cancer screening and prevention among ADA women in Michigan who participated in the Kin Keeper^{SM} cancer prevention intervention program. The literacy assessment tools were orally administered pre and post intervention. The results of 100 women showed that the suggested intervention significantly improved women's knowledge of breast-self exams and clinical breast exams. Women who had higher levels of education were more likely to benefit from this intervention.

Another interventional study conducted by Williams et al. (2011) focused on differences in knowledge and socioeconomic factors associated with breast cancer screening among African American, Arab, and Latina women in Michigan. The results revealed that African American women knew more about breast cancer screening at the baseline, although all three women groups had significantly increased their knowledge

after having participated in the breast cancer prevention intervention. The authors highlighted the need for tailored information on breast cancer screening for African American, Arab, and Latina women to promote adherence to breast cancer screening guidelines. Geltman et al. (2013), by contrast, compiled data on oral health HSU and functional health literacy among 439 Somalis in Massachusetts, finding that 74.3% had low health literacy. Lower literacy scores correlated marginally with periodontal disease. Additionally, the researchers found that refugees who had been in the United States five or more years and who had adequate literacy levels were more likely to pursue and gain access to preventive dental care. Roman et al. (2014) conducted another study of the same sample used by Williams et al. (2011), investigating associations between breast and cervical cancer screening adherence and co-occurring risk factors (e.g., health literacy). The study was conducted among three racial/ethnic groups of underserved Black, Latina, and Arab women. The authors found that a lack of doctor recommendations was significantly associated with decreased odds of a clinical breast exam mammogram and Pap screening test among women. Furthermore, limited health literacy levels were associated with reduced preventive screening for Black women.

Several studies focused on a specific group of ADAs. For instance, a study conducted by Hatamleh (2015) focused on Iraqi immigrant adults' level of health literacy by applying an intervention educational program. Health literacy level was measured pre and post intervention by administering the Test of All Aspects of Health Literacy Scale (AAHLS) to 30 participants. The author reported a significant different between pre and post total health literacy scores. Based on the responses, new immigrants to the United States need a health-related consultation center. Also, the author indicated that there is a

need for similar programs to be regularly conducted to address the health concerns and questions of Arab immigrants. Another study by Jacoby et al. (2015) explored the level of health literacy and the perinatal experiences of Somali women living in Lewiston, Maine. The results of the Newest Vital Sign (NVS) health literacy evaluation indicated that nine participants (47.0%) had a high likelihood of limited literacy, finding that 10 participants (53.0%) were potentially at risk for limited literacy and that none of the participants had adequate health literacy levels overall. The authors created an educational health brochure that healthcare providers could use to enhance communication. This brochure was also intended to improve understandings of prenatal health, including emergency cesareans and postpartum depression.

Talley and Williams (2015) examined the relationship between age, comorbidity, breast and cervical cancer literacy in a sample of African American, Latina, and Arab women ($N = 371$) from Detroit, Michigan. They measured breast cancer literacy using the Breast Cancer Literacy Assessment Tool and cervical cancer literacy using the Cervical Cancer Literacy Assessment Tool. An age-adjusted Charlson Comorbidity Index was used to describe the impacts of age and comorbidity on breast and cervical cancer literacy. The results indicated that for breast cancer, literacy differed significantly among groups, with Latin women having significantly less breast cancer literacy than African American and Arab women. Similarly, age-adjusted comorbidity scores showed a significant difference among groups, particularly in African American women. Cervical cancer literacy comparisons were not significant among the three ethnic groups.

The only pharmacy practice research to directly explore health literacy level and medication-related behavior was conducted in Buffalo, New York, by Prescott et al.

(2018), who developed a community-based educational workshop to enhance refugees' health literacy on medication. The researchers offered translated materials, interpreters, hands-on materials, and evaluations to educate refugees about medication-related problems. The study sample involved refugees from several Arab countries, including Somalia (9.6%), Syria (8.0%), Iraq (5.2%), Yemen (4.0%), and Sudan (2.0%). The results showed an average of 78.0% correct responses on post-evaluation questions assessing refugees' understanding of workshop concepts. The authors emphasized the need for a health literacy program to provide basic medication-related information, and they highlighted the importance of helping refugees become familiar with navigating the U.S. healthcare system.

Only a limited number of studies explored health literacy levels among ADAs, and many that did were related to maternal and child health, or women's health. In addition, several studies focus on limited health literacy level as a barrier to screening and treatment of cancer among ADAs (Ghebre et al., 2015; Raymond et al., 2014; Barrett Sewali et al., 2015; B. Sewali et al., 2015; Talaat, 2015).

Perceived Discrimination Against ADAs

Perceived discrimination due to race or ethnicity is also prevalent in the United States. It can be defined as differential treatment, on the basis of race and other inadequately justified factors, that disadvantages a racial group (Shavers et al., 2012) and has been increasingly recognized as one of the main mechanisms for explaining racial and ethnic health disparities in the United States (Abdulrahim et al., 2012). Previous results of a nationwide poll of the United States revealed that 74.0% of African Americans, 69.0% of other non-Whites, and 30.0% of Whites reported having personally

experienced general race-based discrimination (Shavers et al., 2012). Much research has shown that perceived discrimination due to race or ethnicity is associated with a variety of unfavorable health outcomes, including less use of cancer screening, less use of preventive HSU, increased exposure to the HSU, delays in seeking medical care, and poor adherence to medication and medical care recommendations (Benjamins, 2012; Casagrande et al., 2007; Fazeli Dehkordy et al., 2016; Hausmann et al., 2008; Lee et al., 2009; Mouton et al., 2010).

In response to attacks carried out by Arab terrorists since September 11, 2001, ADAs have reported a heightened level of societal stressors, including ethnic-based harassment, perceived discrimination, and hate crimes, which may have heightened their risk of psychological distress, negatively affecting their overall health outcomes (Amer & Hovey, 2012; Zarrugh, 2016). Furthermore, the negative U.S. sociopolitical sentiment toward ADAs during the 2016 presidential campaign contributed to record reporting of discriminatory incidents and hate crimes by this marginalized group (Lichtblau, 2016). Only a handful of studies have considered the impact of perceived discrimination due to race or ethnicity in relation to ADAs' health outcomes. Most of the available research into particular health outcomes has included mental health well-being and psychological stress outcomes.

A pilot study conducted by Hassouneh and Kulwicki (2007) evaluated mental health status, perceived discrimination, and trauma among Muslim women living in Oregon. The sample of 30 women displayed significant higher depressive symptoms than individuals in general population aged 40–54 ($p = 0.034$) and 55–69 ($p = 0.006$). The comparison was based on the Center for Epidemiological Studies Depression Scale

CES-D using data from 1990 (Gatz & Hurwicz, 1990). For anxiety, the mean of Beck Anxiety Inventory scale (BAI) scores indicated that participants experienced significantly higher anxiety symptoms than those in the general population ($p = 0.001$; Gillis et al., 1995) and older adults ($p = 0.001$; Morin et al., 1999). Furthermore, results indicated that 93.0% of the sample had experienced some form of trauma—a rate of reported traumatic events significantly greater than that reported earlier for the U.S. population (Green, 1996; Green et al., 2000). Findings indicated that 63.0% had increased perceived discrimination experiences, and 67.0% more overall stress, after the September 11 attacks. Finally, 43.0% reported that war and/or hate crimes had adversely affected their mental health or the mental health of one or more of their relatives.

Padela and Heisler (2010) investigated the prevalence of abuse and perceived discrimination among ADAs after 9/11, assessing the associations between perceived discrimination and the three concerning outcomes: psychological distress, level of happiness, and health status. Of 1,016 respondents from the Detroit Arab American Study (DAAS) 2003 data, 25.0% reported personal or familial abuse after 9/11 and 15.0% reported enduring perceived discrimination due to their Arab ethnicity. Perceived discrimination post 9/11 was significantly associated with higher level of psychological distress, lower level of happiness, and worse health status. Increased psychological distress and decreased happiness were associated with personal perceived discrimination experiences linked to ethnicity. Higher rates of psychological distress were correlated with those who had perceptions of non-respect within U.S. society. Finally, respondents who reported that their personal safety and security had been affected showed higher levels of psychological distress.

Ahmed et al. (2011), by contrast, examined sociocultural adversities' (perceived discrimination and acculturative stress) and cultural resources' (ethnic identity, religious support, and religious coping) direct impact on psychological distress among ADA adolescents in Detroit, with the 240 eligible participants indicating a strong positive relationship between sociocultural adversities (perceived discrimination and acculturative stress) and psychological distress (standardized coefficient = 0.84, $p < 0.05$). Furthermore, higher levels of cultural resources (ethnic identity, religious support, and religious coping) were related to lower psychological distress (standardized coefficient = – 0.56, $p < 0.05$). Despite the significance of the findings, the results' generalizability is limited. The sampling method depended on student self-selection for participation, so students who experienced higher levels of perceived discrimination or acculturative stress might have been more likely to be involved. In addition, most members of the sample identified as Muslims, who experiences are not necessarily reflective of the experiences of their Christian adolescent ADA counterparts.

Investigating the association between perceived discrimination and the psychological distress it creates, Abdulrahim et al. (2012) conducted an analysis based on the DAAS data, finding that members of younger generations who had a high school education or higher and who were unmarried, Muslim, and U.S.-born Arab or non-White racial identifying were more likely to report discriminatory experiences. The results showed a significant association between psychological distress and perceived discrimination regardless of whether ADAs identified themselves as White—but stronger for those who identified as White. Moreover, even though more Muslim ADAs reported perceived discrimination, the association between perceived discrimination and

psychological distress significantly affected their Christian ADA counterparts. The association between perceived discrimination and distress was weaker among ADAs who had a lighter skin color. The researchers found that the perceived discrimination–distress association was stronger for those raised outside ethnic enclaves (lower ADA-resident areas). Finally, ADAs who did not claim a White identity were subjected to perceived discrimination more intensely but less affected by it. This study supported the presence of a significant association between perceived discrimination and poor health among ADAs.

The same conclusions were reached by Assari and Lankarani (2017), who also investigated the role of gender on the perceived discrimination–distress association among a representative sample (337 males, 385 females) of ADAs (Assari & Lankarani, 2017). They found that gender moderated the perceived discrimination–distress association, more strongly for males than females. The results of both studies might not be generalizable to ADAs nationally, due to the unique racial history of the Detroit region and the socioeconomic profile of Detroit ADAs.

Another study supporting the correlation between perceived discrimination and psychological distress was conducted by Ikizler and Szymanski (2017), who utilized a survey to examine the effects of religious affiliation, ethnic identity, and family connectedness on the correlation between perceived discrimination and psychological distress among ADAs in Knoxville, Tennessee. The researchers discovered that 60.0% of women and 40.0% of men from a sample of 122 displayed that their religious identification as Muslim ADAs predicted significantly greater perceived discrimination toward those displaying a high level of religiosity. Moreover, they reported that religiosity ($\beta = 0.39$) and family connectedness ($\beta = 0.27$), or an individual's reliance on

family in the financial, functional, and psychological domains, significantly moderated the perceived discrimination–distress association. ADAs experienced higher levels of ethnically based perceived discrimination and increased distress level as their religiosity increased. Considering family connectedness as a variable, ADAs who had low levels of family connectedness were susceptible to psychological distress connected with ethnically based perceived discrimination, whereas those who had high levels of family connectedness were less adversely affected by ethnically based perceived discrimination.

In a similar study, Dhalimi et al. (2017) conducted a cross-sectional study to examine the factors associated with perceived discrimination, ethnicity, and migration status, as well as their implications for health (self-rated health [SRH] and depression) among a specific group of ADAs (Iraqis) in Michigan. Independent (chi-square) tests revealed that unemployed participants had significantly more experiences of perceived discrimination than their employed counterparts. In addition, the logistic regression indicated a significant association between participant age and sex, with women and the elderly more likely to have experienced perceived discrimination. Unemployed individuals who had poor language skills were more likely to feel significant depression. The researchers found that age, when experiencing perceived discrimination, was a significant predictor for depression. Finally, they found that female and unemployment participants recorded fair to poor health. Significant predictors for reporting poor to fair SRH were older age, worse language skills, and experience of perceived discrimination. The study incorporated a selection bias, however, with participants recruited from a scientific organization, which could endanger the generalizability of the results.

Outcomes

Medication Adherence

The magnitude and significance of medication adherence has become an important component in clinical trials. Assessment of medication adherence is considered to be a quality measure during evaluations of healthcare plans by the National Committee for Quality Assurance and Center for Medicare and Medicaid Services (U.S. Centers for Medicare and Medicaid Services, 2018). Poor medication adherence could increase disease progression and complications, decrease quality of life, increase death rates, and cause a rise in unnecessary healthcare expenditures (Derenthal et al., 2018). In general, about 50.0–60.0% of patients do not adhere to their prescribed medications, especially those suffering from chronic diseases (Lam & Fresco, 2015). In the United States, up to $300 billion in annual avoidable healthcare costs was attributed to medication nonadherence, accounting for up to 10.0% of total healthcare costs (Zullig & Bosworth, 2017).

The WHO has considered multiple interrelated factors that hinder medication adherence. Some factors are patient-related, such as age, gender, race, and ethnicity—particularly among minorities. Socioeconomic factors (e.g., education, income, health literacy) have also been identified (Devine et al., 2018; Zullig & Bosworth, 2017). Evidence supports the existence of race and ethnic disparities in adherence to prescribed medication regimens (Wilson et al., 2016; Xie et al., 2019). A national study predicting factors in low medication adherence found that medication adherence remains a significant issue among ethnic minorities, particularly among those of Hispanic origin and African Americans, even after adjusting for income and insurance status (Feehan et

al., 2017). Other evidence suggests that certain racial and ethnic groups are more concerned about taking daily medications for chronic conditions than their non-Hispanic White counterparts. These concerns could impact their medication adherence for multiple disease conditions, such as asthma, chronic obstructive pulmonary disease (COPD), depression, HIV/AIDS, and hypertension (Horne et al., 2013).

In our review of the literature, only one study was found to assess medication adherence among ADAs. Tailakh et al. (2016) examined the relationships between acculturation, medication adherence, lifestyle behaviors (e.g., physical activity, nutrition, weight control), and blood pressure control among hypertensive ADAs in California. A cross-sectional descriptive design was utilized, with a convenience sample of 126 participants completing questionnaires while their blood pressure, weight, and height were measured. Only 46 (36.5%) participants were hypertensive and were included in this study. Medication adherence was measured using the Morisky Medication Adherence Scale-8 (MMAS-8) by means of self-administered questionnaires. Only 52.2% of participants were taking antihypertensive medication, and among those who reported taking doing so, 29.2% described high adherence to medication, compared with 25.0% and 45.5% of respondents who reported medium and low adherence, respectively. Researchers also found that participants who had a high medication adherence score were significantly associated with lower diastolic blood pressure and maintenance of a healthy diet and lifestyle modifications. However, they found no significant relationship between acculturation and medication adherence, perhaps reflecting the small, community-based, and homogeneous nature of the sample and thus explaining the nonsignificant association between these variables.

Healthcare Services Utilization (HSU)

According to Manuel (2018), several studies found disparities in HSU and access in which racial and ethnic minorities were less likely to have a usual source of care, had lower preventive care utilization, made fewer physician visits, and made fewer health expenditures (Manuel, 2018). The studies were conducted using different methodologies, with researchers using different criteria to measure HSU, such as the recall time frame, utilization frequency, and utilization type. For example, some studies presented HSU as physician office (outpatient) visits, preventive healthcare, mental health visits, emergency room visits, or length of hospitalization (Alcalá & Cook, 2018; Seo et al., 2016). Other studies explained HSU as the awareness of, need for, or use of medical or physiological health services (Elsouhag et al., 2015).

Chen et al. (2016) and Manuel (2018) assessed racial and ethnic differences in HSU and access after full implementation of the Affordable Care Act (ACA) health insurance mandate in 2014. Both studies used secondary data from the National Health Interview Survey (NHIS). Chen et al. (2016) measured the HSU as the probability of making any emergency department (ED) visit or physician visit. Like Chen et al. (2016), Manuel (2018) added the utilization of mental health services during the preceding year. The study also included delays in needed medical care if they arose from a lack of finances. Based on the 2006–2014 and 2012–2014 analyses, they found differential patterns in HSU and access by race/ethnicity and gender. Non-Hispanic Whites had the greatest gains in HSU and access. The results showed significant increases in office visits of 10.4%, 9.2%, and 4.6% for Asian, Hispanic, and White men, respectively. Among other ethnic groups, African American women fared the worst with respect to ED visits

and unmet needs. Overall, African American respondents were among the most disadvantaged groups in this sample.

The 2011–2014 results of Chen et al. (2016) also showed that African Americans were more likely than other racial and ethnic groups to have delayed or forgone care in 2014. For the physician visit outcome, Latinos, African Americans, and Whites were 5.0%, 3.0%, and 2.0% more likely, respectively, to have made any physician visit during 2014 compared with 2011. The probability of having any physician visit in 2014 was 3.0% higher for Latinos than other racial and ethnic groups. The researchers did not find any significant changes in ED visits before and during 2014 among the different racial groups in the study. Overall, the results indicated significant variations in healthcare access and HSU among the different race and ethnicity categories under the ACA. Although both studies analyzed HSU of national data, the data featured only had crude measures of race and ethnicity. HSU patterns under the ACA for specific racial and ethnic subgroups are still scarce.

The available research on HSU among ADAs lags advanced research on the same utilization patterns among other racial, immigrant, and minority groups. Although most ADA HSU studies focused on preventive HSU, a few others considered mental and general HSU.

Preventive HSU. Many of the preventive HSU studies applied a qualitative approach to explore patterns of preventive HSU for an ADA sample with different countries of origin (Alsayid et al., 2019; Kawar, 2013; Padela et al., 2016; Saadi et al., 2012; Saadi et al., 2015). Some other studies focused on those of Somali Arab origin residing in Minnesota (Ghebre et al., 2015; Raymond et al., 2014; B. Sewali et al., 2015)

and New York (Carroll et al., 2007). Other cross-sectional studies approached the preventive HSU variable by focusing on breast cancer examination and screening as a primary outcome (Alatrash, 2019; Jaffee et al., 2015; Kawar, 2009; Padela et al., 2015; Petro-Nustas et al., 2012; Schwartz et al., 2008).

Another way to measure preventive HSU is by use of mammography screening (MS), as studied by Schwartz et al. (2008). The results of a telephone survey of 365 ADA women residing in metropolitan Detroit showed that 58.1% reported having a mammogram every one to two years, whereas 29.9% had had no mammogram or had had their most recent mammogram more than five years prior. Additionally, insured married older adult women who had lived in the United States for more than 10 years were associated with mammography every one to two years. The country of origin also was significantly associated with mammography at that frequency. The odds of mammography for women from Lebanon were three times greater (OR 3.01, 95% CI 1.20–7.56) than for women from other Middle Eastern countries.

Another study focused on MS among ADA women was conducted by Alatrash (2019), who explored MS prevalence and investigated differences in attitudes and beliefs about breast cancer screening in three subgroups: Lebanese, Jordanian, and Egyptian ADA women in California. The results of the survey revealed the prevalence of MS, which was 63.9% lower than that in all women 40 years and older who had mammography in the United States. These results were lower than the prevalence detected by the National Health Interview Survey for 2000–2015 among women aged 50-74 years (71.7%). Reported perceived barriers included impact of culture, lack of time,

modesty, fear of being diagnosed with breast cancer, embarrassment about exposing the body, and fatalism.

Several studies examined cervical cancer screenings among ADAs as a primary outcome for preventive HSU. Most of these studies were conducted on a specific sample, such as Somalis in Minnesota (Ghebre et al., 2015; Morrison et al., 2013; Pruitt et al., 2013; Barrett Sewali et al., 2015). One study found that adherence to cervical cancer screening was associated with more overall healthcare system visits (Morrison et al., 2013). Another study noted that participants who reported having friends or family members to talk with about cancer screening were approximately three times more likely to complete any screening test. In addition, participants who reported having resided in the United States longer were more likely to undergo cervical cancer screening (Barrett Sewali et al., 2015) . The results of the qualitative study identified some barriers among participants, such as knowledge limitations, embarrassment, fear, and fatalism. Stigma related to cancer was one of the community barriers, as were the roles of culture and modesty. Some barriers were related to the system, such as lack of trust in the healthcare system and doctors, language, and logistics (Ghebre et al., 2015).

Another study conducted by Padela et al. (2014) focused on cervical cancer screenings among Muslim women in greater Chicago. Their sample included nearly equal numbers of ADAs, South Asians, and African Americans. Rates of those who had ever received cervical cancer screening were similar to those seen in other studies (84.0%). The researchers found that having lived in the United States for more than 20 years (OR = 4.7, 95% CI = 1.4–16) and having a primary care physician (OR = 7.7, 95% CI = 2.5–23.4) were positive predictors of receiving a Pap screening test. A secondary data

analysis of 2005, 2008, 2010, 2013, and 2015 NHIS data was used by Endeshaw et al. (2018) to estimate the utilization of cervical cancer screening among women by birthplace. Among foreign-born women, Middle Eastern origins were indicated for 3.0% of the sample population. Foreign-born women 18 years or older from Mexico (9.8%), South America (12.6%), the Caribbean (14.6%), Southeast Asia (13.7%), Central Asia (20.4%), South Asia (22.9%), the Middle East (25.0%), Africa (27.8%), Europe (16.4%), and the former Soviet Union (28.2%) were significantly more likely to be unscreened than U.S.-born women (7.6%). After adjusting for sociodemographic and health care access, women aged 21- 65 years from the Caribbean (23.3%), Europe (24.9%), FSU (42.8%), Africa (36.8%), Middle East (35.1%), Central Asia (28.7%), and South Asia (33.5%) were more likely than U.S.-born women to not have undergone a Pap screening during the preceding 3 years. The results emphasized the existence of health disparities and dissimilarities in healthcare access and HSU between foreign- and U.S.-born persons.

Colorectal cancer screening has also been investigated among ADAs. Talaat and Harb (2013) conducted a community-based observational study focused on the reluctance to undergo screening colonoscopy among ADAs in Michigan. A majority of the 130 ADA participants (80.0%) were from Lebanon (52.3%) and Yemen (27.7%). A majority of participants (89.0%) had health insurance, and 86.0% had a primary care physician, of whom 79.0% spoke Arabic. The researchers found that 45.0% of participants had not undergone screening. Females were more likely to have undergone screening, and their length of stay was positively associated with having done so. The results showed a positive relationship between those who had had the screening and

those who had primary healthcare physicians and non–Arabic-speaking primary care physicians.

Another study examined that adherence and barriers to colorectal cancer screening among ADAs from different countries of origin, based on the same data by Talaat and Harb (2013). The researchers found that among the participants, Yemeni men were more likely be unscreened. Also, unscreened Lebanese participants were found to have a higher family history of colorectal cancer. In addition, the most common reported barrier for both groups was the misconception that colorectal cancer screening was not necessary. The author also noted that Yemenis were uninformed about this screening (Talaat, 2015). A qualitative study conducted by Alsayid et al. (2019) explored the utilization of colorectal cancer screening in the ADA community in California's San Francisco Bay Area. A thematic analysis of 11 males participating in two focus groups was generated and categorized into barriers and facilitators. The researchers reported three barriers to screening: disbelief in modern medicine, concerns about the procedure, and lack of communication with the physician. Conversely, the three facilitators were compliance with the health practitioner's recommendations, access to healthcare, and awareness.

Further research has been conducted on various preventive HSU among ADAs. Darwish-Yassine (2005) analyzed data from the Michigan Special Cancer Behavioral Risk Factor Survey (SCBRFS), which included a random sample of the general Michigan population with oversampling of African Americans, American Indians, Hispanics, and ADAs. The reported screening rate for colorectal cancer among ADA men and women (25.6%) was lower than that reported by the general population (31.1%). In addition,

77.0% of ADA women aged 50 years or older had received a Pap screening during the preceding three years, compared with 87.0% of the general population in Michigan, 86.0% of American Indians, 85.0% of African Americans, and 77.0% of Hispanics.

Salman (2012) investigated the utilization of breast and cervical cancer screenings and the factors that could impact this behavior on a group of Arab-American immigrant Muslim women residing within the community in South Western Pennsylvania. A self-administrative questionnaire obtained from 50 participants showed that the majority of the respondents who were aged 41 years or older (86.7%) underwent mammography screenings. However, 50.0% were less likely to undergo a Pap screening test. A significant correlation was found between having prevention screening and variables, such as economic concerns, religious, emotional reaction (e.g., embarrassment), and length of time lived in the United States. Even though the sample size was relatively small and might not represent all Arab Muslim women in this community, it provided some insights into this minority population's conduct regarding preventive HSU.

A community-based randomized controlled trial conducted by Williams et al. (2013) evaluated the effectiveness of the Kin Keeper^{SM} Cancer Prevention Intervention, a family-focused educational intervention for underserved African American, Latina, and ADA women. The outcomes of the study focused on the utilization of clinical breast exams, mammography, and Pap tests. They found significant variation in screenings by race and ethnicity. Latinas (63.1%) were significantly less likely to have ever had an age-appropriate mammogram than African American (84.8%) and ADA women (85.6%; $p < 0.01$). In addition, ADA women aged 21 years or older were significantly more likely

(71.0%) to have undergone Pap screening during the preceding 3 years than Latina women (68.0%) but less likely than African American women (83.0%; $p < 0.01$).

For vaccines and cancer screenings (e.g., flu or pneumonia vaccine, clinical breast examination, mammogram, Pap smear), a nationwide study by Dallo and Kinratt (2015) estimated a significant prevalence of not receiving such screenings among U.S.- and foreign-born White women compared with women from Europe and Arab nations. They pooled 12 years of NHIS data ($N = 117,893$; Europe = 3,744 vs. Arab nations = 205). To approximate an "ADA" ethnicity, they identified 15 "Arab" countries from the Middle East regions and found that, compared with U.S.-born, foreign-born Whites from the Arab countries had higher estimates of not receiving recommended vaccinations and cancer screenings. Foreign-born ADA women were significantly less likely to report having received a flu vaccine, pneumonia vaccine, Pap smear, or clinical breast examination than U.S.-born White women. There were no differences for mammography.

Another nationwide study, also conducted by Dallo and Kinratt (2015), explored the age-adjusted prevalence of not receiving a flu vaccine, pneumonia vaccine, or prostate cancer screening among U.S.- and foreign-born White men by region of birth (Europe, Russia, and Arab nations), applying the same 12-year NHIS data among a total of 91,636 men who were U.S.-born ($n = 88,413$) as well as of European ($n = 2,567$) and Arab origin ($n = 238$). Foreign-born ADA men were significantly less likely to report receiving a flu and pneumonia vaccine than U.S.-born White men. For prostate cancer screening outcomes, no statistically significant differences between ADAs and White men. However, both nationwide studies included only 15 of the 25 countries in the MENA region. Furthermore, the study identified the ADA ethnicity as respondents who

reported that they were not born in the United States and who were born in one of the 15 countries included in the MENA region variable, thus excluding all 1.5- and 2nd-generation ADAs. Regarding this limited identification of ADAs, differences in sample size were seen among the foreign-born population (Dallo & Kindratt, 2015a, 2015b).

Another measure of preventive HSU was hepatitis C virus (HCV) screenings and vaccinations among ADAs. A study by Perumalswami et al. (2014) of Egyptians in New York found that of 192 participants, 30 persons (15.6%) were HCV-positive. The prevalence of HCV antibody in those of Egyptian origin increased sharply with age and was correlated with a longer number of years lived in Egypt. For vaccination, a study conducted in Michigan by Salim et al. (2019) focused on vaccine knowledge, awareness, and utilization among ADAs prior to the *Hajj*. The results of the questionnaire for 277 adult participants identified some barriers to vaccine utilization, such as a lack of knowledge and perceived low personal risk of disease. They found several prominent barriers, such as the fear of receiving an injection and concerns regarding vaccine side effects.

Mental HSU. Limited research addresses mental HSU as a primary outcome. One such study, conducted by Kulwicki et al. (2010), explored barriers to utilization of domestic violence services among ADA immigrant women as perceived by professionals, service providers, and community leaders. The researchers explored the role of personal resources, family, religion, culture, and social support system in the utilization of domestic violence services by ADA immigrants experiencing domestic violence. Another cross-sectional exploratory descriptive study of intimate partner violence, depression, and barriers to service utilization among ADA women found that women

who were at risk for intimate partner violence had higher depression scores. The researchers also found that barriers to services for ADA women decreased for those who had lived more than 10 years in the United States. Investigators revealed a significant negative relationship between barriers to service and depression; barriers to service and intimate partner violence; and number of years lived in the United States and depression (Kulwicki et al., 2015).

In a study focused on HSU of psychotherapy in a mixed-origin ADA sample in New York, the main challenges to psychotherapy utilization were hesitancy to discuss family problems outside the family and to seek treatment. As individuals pursued counseling, therapists identified a large number of intergenerational tensions and challenges in transitioning as key grievances to mainstream culture (Martin, 2014). Another study has been conducted of Somalis as a particular sample of ADAs (Ellis et al., 2010), with a mixed-method approach used to examine the mental HSU of Somali adolescents while exploring the role of religion, community, and school as gateways to healing. Results showed low rates of mental HSU. More often, other sources of help, such as religious and school staff, were accessed.

General HSU. A number of studies considered HSU among ADAs. Several of these used focus groups to study Somali ADAs and how they adjust and improve HSU (Deckys & Springer, 2013; DeShaw, 2006; Pavlish et al., 2010; Wissink et al., 2005). In another featuring mixed ADA focus groups, Kulwicki et al. (2000) identified needs and barriers as including ADAs families' unique caring behaviors, the complexity of the healthcare system for ADAs, communication gaps, the diversity of perceptions of

cultural competency, obstacles to accessibility of care, and issues of diversity in the workforce.

One of the earlier cross-sectional studies, conducted by May (1992), focused on help-seeking for child healthcare among ADAs' parents. Family and relatives were perceived as a primary source of support and contained the highest percentage of social network members. A study by Berlie et al. (2007), in contrast, focused on drug utilization (glucose-lowering agents and aspirin therapy) among diabetic ADA patients in Michigan. The data of this study were collected through self-reported medication history and were compared to the third National Health and Nutrition Examination Survey (NHANES) and the Behavioral Risk Factor Surveillance System (BRFSS). Results from 53 participants revealed that ADA diabetic patients were less likely to be treated with insulin and more likely to receive oral hypoglycemic agents than U.S. adults in general. They found also that the use of aspirin among study participants was significantly lower (23.0%) than the reported national aspirin intake prevalence (64.0%). However, there was no statistical difference among the two groups on insulin–oral hypoglycemic combined therapy. Overall, the evidence from this study suggested that the therapeutic management of diabetes in the ADA patients with diabetes was suboptimal.

A study conducted in Michigan by Elsouhag et al. (2015) found differences in HSU between Iraqi immigrants and refugees, with immigrants having significantly lower HSU. HSU was significantly associated with refugee status, married status, and health insurance. In this study, no immigrants had utilized psychological services. Among refugees, psychological services were inversely associated with the use of stress medication and strategies for dealing with stress. Another study conducted by Taylor et

al. (2014) in Michigan, California, Texas, and Idaho found that a high proportion (75.0%) of the participants reported being covered by health insurance such as Medicaid or state health insurance. Of the 84 respondents who were not covered by health insurance, 36 (42.0%) reported one chronic health condition and 18 (21.0%) reported two or more. The family clinic has been identified as the most common place of healthcare for patients with or without health insurance (90.0% and 69.0%, respectively), followed by an emergency department visit (19.0% vs. 38.0%; $p = 0.08$). Although many participants had insurance, 43.0% of participants reported having needed care for a medical problem but delayed it or not sought treatment during the past 12 months. Some of the barriers reported included financial reasons, lack of an interpreter, lack of transportation, and ignorance of where to go (Taylor et al., 2014).

Ping Ma et al. (2013) examined the utilization of prenatal care among ADA women living in the Greater New Orleans area. By conducting a cross-sectional study using face-to-face interviews or telephone interviews questionnaire, they found that most participants had received prenatal care during their most recent pregnancy, with 90.0% having had their first prenatal care visit before the 12th gestational week. Participants in revealed various reasons for not having acquired early prenatal care, including difficulties scheduling a doctor visit, absence of health issues, previously having struggled to schedule a doctor's visit, or lack of insurance. Vu et al. (2016) assessed the association between religious factors and delayed care seeking due to a perceived lack of female healthcare providers among American Muslim women in Chicago, finding that 33.0% of the sample were from ADAs and that overall 53.0% reported delays in care seeking due to a perceived lack of female clinicians. The researchers also found that after adjusting

for sociodemographic factors in multivariate analysis, higher religiosity and modesty levels had a significantly positive association with delayed care seeking. More than 20 years' residence in the United States was negatively associated with delayed care seeking.

Gaps in the Literature

In the United States, much of the conceptual knowledge on racial/ethnic health and health outcomes research has been developed around specific racial/ethnic populations, such as African Americans, Hispanics, and Asian Americans (Abdulrahim et al., 2012; Gee et al., 2009). Among other racial and ethnic minorities are such groups of ADAs who can be classified as White but have a discursive position in relation to U.S. racial categories. Although the Office of Management and Budget classifies people who have roots in any of the 22 MENA Arab countries as White, research has showed that a large proportion of ADAs identify themselves as non-White (Abdulrahim et al., 2012). Thus the national representation of ADAs' health information is obscure, requiring collection of local and national health data to improve health and healthcare outcomes.

Review of ADAs' health literature shows that most such studies have been conducted on specific ADA samples and subpopulations. The review of Abuelezam et al. (2018) showed that a majority of studies (around 36.0%) were undertaken in Michigan. Many other states are represented in the literature, however, including Minnesota (12.0%), California (5.0%), New York (3.0%), and Virginia (2.0%). Only eight studies examined national samples of ADAs (3.0%), whereas some examined ADAs from multiple cities ($N = 9$, 4.0%). Although Florida has the fourth-largest ADA population,

concentrated in southern Florida, no known study has addressed the health needs and health outcomes (HSU and medication adherence outcomes) of ADAs in this state.

Summary

The literature review highlighted the current poor health of adult ADAs. Additionally, it revealed the unique conditions, social determinants, and historically underserved status that impact their overall health and health outcomes. As also noted, this population exhibits many poor health outcomes, unmet needs, and barriers. Accordingly, this mixed-method study fills the lacuna in the literature by exploring the impact of health literacy level and perceived discrimination on HSU and medication adherence outcomes for ADAs in South Florida. Chapter 3 illustrates the methods used in both phases of the study (qualitative and quantitative) and how they fit into the conceptual model proposed herein.

Chapter 3

Methods

Research Design

This study uses a mixed-method approach to explore the impact of health literacy level and perceived discrimination and its effect on HSU and medication adherence outcomes among ADAs. Following a comprehensive examination of extant literature, an exploratory sequential mixed-method design was identified with which to investigate the question of interest (see Figure 3.1). This design is characterized by an initial exploratory qualitative phase of data collection and analysis, follows with a phase of quantitative data collection and analysis, with concludes with a final phase of integrating both types of data (Creswell & Creswell, 2017; Creswell et al., 2003).

The rationale behind using both methods—qualitative, then quantitative—lies in the current dearth of literature regarding ADAs' health. Before conducting any quantitative measurements, a qualitative phase is needed prior to exploring what should have been asked. The qualitative findings should provide much-needed insight into participants' perspective on factors that could affect their health outcomes (e.g., HSU and medication adherence), and a quantitative approach will also examine the research questions among ADAs. In addition, neither quantitative nor qualitative procedures are sufficient, in isolation, to generate the data necessary for capturing the details of the

research problem. Several authors have employed this methodology in social and behavioral science research (Caracelli & Greene, 1997; Creswell et al., 2003; Teddlie & Tashakkori, 2003). This method is most appropriate when seeking to understand the impact of factors such as health literacy and perceived discrimination and their effect on HSU and medication adherence among ADAs.

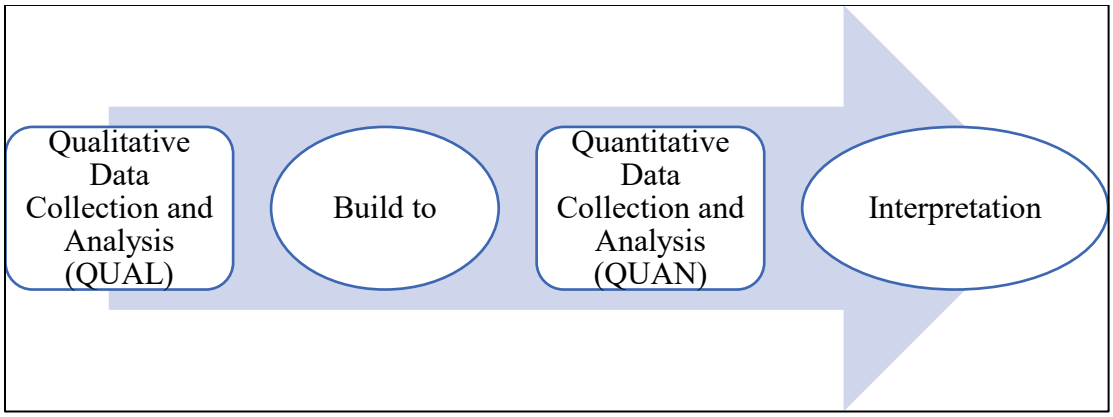

Figure 3.1. Exploratory Sequential Mixed Methods (Creswell et al., 2003).

Theoretical Framework

In seeking to explain the factors that may be associated with HSU and medication adherence, the ABM has been used as this study's guiding theoretical framework (see Figure 3.2). The entire model predicts the pattern of HSU and medication adherence outcomes as well as each ABM component, including predisposing, enabling, and need factors that have an independent impact on predicting the study outcomes (Andersen, 1995; Babitsch et al., 2012; Hoerster et al., 2011). Predisposing factors are those that exist and shape attitudes toward HSU and medication adherence, including demographics (age, gender), social factors (education, occupation, and ethnicity), and health beliefs. Beliefs regarding medications were considered in this study, having been identified as a

significant predictor for medication adherence outcomes (Hwa Yeon Park et al., 2018; Xie et al., 2019).

Enabling factors include barriers to care and resources that promote or inhibit HSU, including personal factors such as income, access to care, and health insurance, which are predictive factors of HSU and medication adherence. Other enabling factors are perceived barriers to obtaining optimal HSU and medication adherence, such as health literacy level and perceived discrimination, which were selected for this study because of their potential to impact the target population.

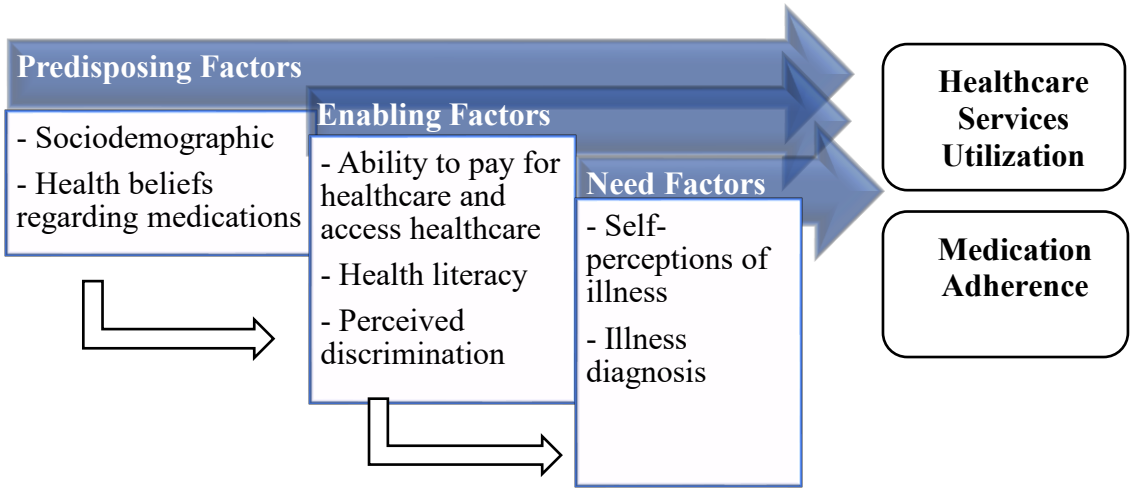

Figure 3.2. Andersen's Behavioral Model of Health Services Utilization.

The final predictors in ABM are need factors, which represent an individual's illness or impairment that necessitates HSU and medication adherence (Andersen, 1995; Babitsch et al., 2012; Stein et al., 2012).

Mixed-Methods

A common application of the sequential exploratory mixed-method strategy is to conduct qualitative research into a particular phenomenon or with a special population,

then use this information to develop a survey instrument appropriate for collecting quantitative data. The synergy from this strategy should provide a more in-depth exploration of patterns of HSU and medication adherence among the target population.

Mixed-Methods Research Question

(Question 1). How does a mixed-method approach, as employed here, expand current knowledge of the HSU and medication adherence of this population? Furthermore, how does this synergistic approach broaden understanding of the various aspects underlying the health outcomes of this group?

Mixed- Methods Data Analysis

The adequacy of a sequential exploratory mixed-method strategy was evaluated to emphasize the initial qualitative phase used to gain insight into an understudied phenomenon (hence the exploratory nature).The synergy resulting from the interplay of both data sources (qualitative and quantitative) was needed to explore the impact of health literacy level and perceived discrimination as well as its effect on the HSU and medication adherence outcomes for ADAs in South Florida.

Participant Recruitment

The targeted population in this study comprised adult ADAs who had been residing in South Florida. The study implemented a snowball sampling approach with the intent of opening as many networks as possible (e.g., fairs, social networks, mosques, churches). This network-based recruitment design has been commonly used to select samples for similar studies, as well as nonprobability samples. Recruitment occurred only in nonclinical settings (e.g., community fairs) through a diverse array of networks within ADA communities, to maximize pattern variations. Survey participants were recruited

from multiple communities in South Florida known for featuring significant numbers of ADAs. Individuals were eligible based on the following inclusion criteria: (1) 18 years or older, (2) of Arab descent, (3) resident in the United States for a year or longer, (4) fluent in reading in English, (5) willing to discuss health status and related factors, and (6) able to understand and provide written informed consent. In both phases (qualitative and quantitative), a prescreening for the study's eligibility criteria was conducted for participant recruitment and participants were compensated with gift cards for their participation. Participants in the qualitative phase received a $50 gift card; participants in the quantitative phase received $20 gift card.

Phase I Qualitative

For the purposes of this study, the qualitative method, as employed here, was a community-based qualitative research project intended to create a dialogue with members of ADAs in South Florida. The focus of this dialogue included health status and the impact of related factors such as health literacy level and perceived discrimination and their effect on HSU and medication adherence.

Qualitative Research Questions

(Question 2). How do focus groups that comprise members of ADA communities help extend understandings of health status and related risk factors among ADAs in South Florida, and how do they explain the impact of health literacy and perceived discrimination on HSU and medication adherence?

Qualitative Data Collection

A convenience sample of 28 participants divided into three focus group sessions was selected out of the ADA population in South Florida. Based on the available

literature, we expected that 25–30 study participants would provide enough information to reach a saturation point—that after which no new information is collected (Castro et al., 2010). Each focus group followed the same procedures and drew on similar protocol guidelines. Focus groups were conducted in a previously assigned NSU College of Pharmacy conference room and were consistent in their delivery. Each session was supervised by Dr. Sánchez, who has ample experience in the design and implementation of qualitative studies and has previously conducted focus groups on the subject of minority health. Each focus group provided an overview of the project, presented an explanation of the project, and obtained informed consent. Focus group sessions were digitally recorded. Moreover, notes were taken of each session. All digital recordings were transcribed verbatim for coding and analysis.

In developing the qualitative protocol, the open-ended questions featured in the focus group interview guide were informed by the ABM components. These questions involved the role of predisposing, enabling, and need factors in jeopardizing the health and well-being of ADAs in South Florida. Also, the influence of health literacy and perceived discrimination, particularly on HSU and medication adherence, was investigated.

Qualitative Data Analysis

Verbatim transcripts of the three audiotaped focus groups sessions were transcribed in English. The accuracy of transcription was verified on an ongoing basis by conducting random and periodic checks of the transcripts against the recordings. All transcripts were input into NVivo 12, a qualitative data management software. Data were coded and analyzed using the constant comparative method outlined by Strauss and

Corbin (1990). A preliminary coding framework of relevant themes gathered from the literature was developed prior to conducting the focus groups. In this way, all preconceived notions and assumptions could be documented during the first draft of the framework. After the focus groups were held, the coding framework was revised to incorporate themes generated through an adaptation of the constant comparison methods used in grounded theory. This type of coding involved development of themes that described respondents' accounts of participations in their own words. As codes were developed, they were applied and compared to newly collected data and were modified as necessary.

Phase II Quantitative

The selection of the variable was based on the ABM, as already described. The model consists of three domains measured by a set of variables: (1) predisposing (e.g., age, gender, education, length of stay, place of birth, religious beliefs, beliefs about medication), (2) enabling (e.g., income, health insurance, health literacy, perceived discrimination), and (3) need factors (e.g., self-perception of illness, illness diagnoses). For this phase, the first outcome is HSU including general and preventive care utilizations (Stein et al., 2007; Stein et al., 2012). The second outcome variable is medication adherence among participants currently on prescribed medications.

Quantitative Research Questions

(Question 3). To what extent are predisposing (e.g., age, gender, education, length of stay, place of birth, religious beliefs, beliefs about medication), enabling (e.g., income, health insurance, level of health literacy, perceived discrimination), and need-based (e.g.,

self-perception of illness, illness diagnosis) factors associated with ADAs' HSU and medication adherence?

Hypotheses. Based on the review of the literature, the following research hypotheses are posed in relation to the research question. Each comprises different factors, each of which was addressed separately in the statistical analysis.

Specific Aim. To assess the adequacy of ABM (predisposing, enabling, and need factors) so as to explain HSU and medication adherence in the study population.

Hypothesis 1. All variables considered as part of ABM under the three different domains (predisposing, enabling, and need factors) would be significantly associated with HSU and medication adherence.

Hypothesis 2. Based on ABM, the following sets of predictors would be significantly associated with prediction of HSU and medication adherence: (Model 1) predisposing factors, (Model 2) predisposing and enabling factors, and (Model 3) predisposing, enabling, and need factors.

Quantitative Data Collection

A cross-sectional online self-administrated survey was utilized to collect data during this phase. This approach provided a numeric description with which to investigate the questions of interest relating to ADAs by studying a sample of ADAs in South Florida. Online survey research offered ready access to a target population that was difficult to reach through other channels. The electronic questionnaire was administered via Redcap, a complete system for developing and administering research data collection using multiple modalities, including mobile services.

The sample size was estimated based on an alpha level of 0.05, a 95% (z score = 1.96) margin of error, and a standard deviation of 0.5. Around 20,000 ADAs were anticipated to reside in South Florida. Using a snowball sampling approach and based on the sample size calculation, researchers selected a convenience sample of 325 members of the Arab-descent community in South Florida to participate in the quantitative online survey. Each participant followed the same procedures and were drawn upon similar protocol guidelines. Potential participants were provided with a link to an electronic prescreening form to determine eligibility for inclusion in the current study. Once eligibility was determined, each participant took a structured, self-administered online questionnaire, requiring an average of 40 minutes to complete, that collected basic sociodemographic information as well as data on self-reported health status, health-related quality of life, health literacy, medication adherence, HSU, and perceived discrimination. Pretesting and piloting of the survey was conducted on 30 volunteer respondents, also ADAs, to ensure that the survey questions were clearly articulated and that the response options were relevant, comprehensive, and mutually exclusive from respondents' point of view. Response latency—the amount of time needed to complete individual items in the survey as well as the full survey—was also evaluated during pilot testing.

After completing the survey, participants received a $20 gift card as compensation for their participation. Participants were required by IRB policy to complete a form documenting their waiver of informed consent. No personal identifiers were requested.

Measures

The survey has several validated measures for each construct of the ABM. The dependent variables of this study focused on HSU and medication adherence, whereas the independent variables included predisposing, enabling, and need factors. Appendix B lists dependent and independent variables and questionnaire items.

Dependent Variables

HSU. A variety of methods may be used to obtain data on HSU. Although administrative data provide the most complete source of information on HSU, the data available for ADAs are often limited. An alternative method of obtaining HSU is through self-reported questionnaires. Self-report measures have the advantages of being less time-consuming and more cost-efficient to collect than extracting information directly from administrative data. This method has been used in large national surveys, and most empirical studies use this form data to make inferences about a population's HSU (Leggett et al., 2016; Ngwakongnwi, 2017). The focus of HSU questionnaires relates to type of utilization, or the type of service an individual is seeking. Some forms of HSU are more desirable than others, such as obtaining preventive care in an ambulatory setting, so that health issues can be addressed earlier and more effectively (Stein et al., 2007; Stein et al., 2012). Accordingly, this study categorizes HSU into two types: preventive care utilization and outpatient visits.

The HSU questionnaire featured four items. The first was adapted from Stein et al. (2007): "In the past 12 months, how many visits did you make to a doctor or nurse practitioner for a physical health problem. Do not count times when you only picked up medication or when you saw a doctor when you were hospitalized." Likewise, preventive

care utilization was measured using the following question: “During the last 12 months, did you do any preventive cancer screening (i.e. a breast exam, a pap smear, a colorectal (colon)?” This mixed-method study explored factors that could have impacted HSU (outpatient visits and preventive care utilization) among ADAs in South Florida, so for purposes of analysis, HSU variables were categorized as dichotomous variable (yes or no).

Medication Adherence. Several approaches are available to measure medication adherence behaviors. One is self-reporting, which is affordable, easy to administer, and nonintrusive and can provide information on medication-related attitudes and beliefs (Culig & Leppee, 2014). The Medical Adherence Questionnaire by Morisky et al. is probably the most widely used scale and is the gold-standard measure of medication adherence (Moon et al., 2017). The Morisky scale was originally designed as a four-item scale, but in 2008 an updated scale was developed: The 8-Item Morisky Medication Adherence Scale (MMAS-8) includes seven dichotomous statements, with an additional item scored on a 5-point Likert-type scale. This last item contributes a value between 0.0 and 1.0, in 0.25-point increments on a 5-point scale measuring the frequency at which patients forget to take medications (never = 1.0, once in a while = 0.75, sometimes = 0.5, usually = 0.25, and all the time = 0.0; Morisky et al., 2008).

The MMAS-8 is a scale ranging from 0 to 8, with a higher score indicating that respondents are more likely adherent to their treatment. Highly adherent patients were identified with a score of 8 on the scale, medium adherers with a score 7 to 6, and low adherers with a score of less than 6. The results of the MMAS-8 had a relatively high internal consistency ($\alpha = 0.83$) and the Cronbach’s alpha reliabilities were 0.79 (Morisky

et al., 2008). For the purposes of the analysis, this variable was categorized as a dichotomous outcome based on the adherence levels. The first group comprised the optimally adherent (participants who scored more than 7 on the MMAS-8 scale), whereas low and medium (suboptimal) adherents (participants who scored from 7to 0 on the MMAS-8 scale) were in another group.

Independent Variables

Predisposing Factors. Predisposing factors included sociodemographic variables that could impact outcomes of HSU and medication adherence. Participants self-reported age, gender, education, marital status, religious status and beliefs, country of origin, U.S. birth, parent place of birth, years of residence in the United States, refugee status, current employment status, and highest level of education.

Additionally, medication belief reasons were considered under the predisposing factors for medication adherence outcome. Beliefs about medicines were evaluated using the Beliefs About Medicines Questionnaire (BMQ; Horne et al., 1999), an 18-item assessment of medication beliefs in general (BMQ–General) as well as of specific conditions such as chronic illnesses (BMQ –Specific), in which each item has a 5-point Likert scale response (strongly disagree, disagree, uncertain, agree, strongly agree). Responses were scored from 1.0 (strongly disagree) to 5.0 (strongly agree).

The BMQ–General includes eight items divided between two subscales. The General–Overuse subscale comprises four items that address the concept of over prescription of medication by doctors. Four further items, in the General–Harm subscale, assess beliefs about perception of medicines as essentially harmful and addictive. Aggregate scores for both of the BMQ–General subscales range from 4 to 20, with higher

scores representing an overall negative perception of medication. The BMQ–Specific for chronic conditions contains 10 items in two subscales. The Specific–Necessity scale evaluates the perceived role of medication in protecting against deterioration of present and future health status, whereas the Specific–Concerns scale assesses perceptions of the potential for negative effects from taking prescribed medication. Likewise, a higher Specific–Concerns score represents a negative perception of medication, and a higher Specific–Necessity score indicates stronger perceptions of personal need to adhere to medication.

For the purposes of this study, the BMQ–General scale has been used separately to assess beliefs about medicines among people who do not share a specific condition or treatment (Porteous et al., 2010). The four items on the General–Overuse subscale focused on doctors' use of too many medicines, natural remedies being safer than medicines, doctors placing too much trust in medicines, and doctors' likelihood of prescribing fewer medicines if they spent more time with patients. The General–Harm subscale focused on whether people who take medicines should stop their treatment for a while every now and again, most medicines' being addictive, medicines' doing more harm than good, and all medicines' being poisons (Horne et al., 1999).

Enabling Factors. Enabling factors were assessed in two domains: (1) personal resources (e.g., income and health insurance) and (2) barriers to obtaining HSU and medication adherence (e.g., health literacy and perceived discrimination). Health insurance, which facilitate regular access to care, is a dichotomous variable (yes = 1, no = 0; Stein et al., 2012).

Health Literacy. Level of health literacy is a combination of a person's skills/abilities and situational demand (Pelikan et al., 2014). To address this in the current study, an instrument was used to assess personal skills and additional items for situational complexity and demands.

Multiple screening tools are available to assess the level of health literacy. These screening measures vary in administration time, types of health literacy domains, and measurement approach. There is currently no gold-standard tool for screening level of health literacy; each tool has its strengths and drawbacks. The most commonly used tools are the Test of Functional Health Literacy in Adults (TOFHLA) and the Rapid Estimate of Adult Literacy in Medicine (REALM). However, these instruments focus on measuring reading and pronunciation skills, have been found to be culturally insensitive or inappropriate for nonnative English speakers, and sometimes have ceiling effects (Kordovski et al., 2017; Ylitalo et al., 2018). Although later comprehensive tools were available that involved multiple health literacy domains and differentiated between tasks and skills, the length of these tools limited their convenient function (B, Goncalves, Ricci-Cabello, Ziebland, & Valderas, 2014; Ylitalo et al., 2018).

A brief instrument that has gained popularity in recent years is the Newest Vital Sign (NVS; Weiss et al., 2005), whose six items, based on a nutritional label, assess an individual's reading comprehension, numeracy, function, and decision making based on the idea that reading and interpreting any kind of nutrition label requires the same analytical and conceptual skills needed to comprehend and follow the medical instructions of a provider. The NVS is appropriate for many settings, including clinical settings, and can be self-administered online due its ease of administration. Additionally,

the NVS has been applied in diverse groups of patients (e.g., Caucasians, African Americans, Hispanics; Linnebur & Linnebur, 2018; Miller, 2018; Shealy & Threatt, 2016). The NVS was validated against TOFHLA, has demonstrated good reliability and convergent validity (Kordovski et al., 2017; Shealy & Threatt, 2016), and takes approximately three to seven minutes to administer. Overall score on the NVS correlates to the health literacy level of the individual, with a higher score indicating a higher level of health literacy. A score of 4–6 almost always indicates adequate health literacy, a score of 2–3 the possibility of limited health literacy, and a score of 0–1 suggests a high likelihood of limited health literacy (Weiss et al., 2005).

Another tool was also used to capture the need component of health literacy, consisting of three questions identified by Chew et al. regarding perceived level of difficulty understanding, reading, or reporting medical information (Chew et al., 2008). This instrument was validated with the short-form TOFHLA and the REALM. Chew's Set of Brief Screening Questions (SBSQ) consists of the following questions: (1) How often do you have someone (like a family member, friend, hospital/clinic worker or caregiver) help you read hospital materials or other written material from your doctor or pharmacy? (2) How often do you have problems learning about your medical condition because of difficulty understanding written information? (3) How confident are you filling out medical forms by yourself? The responses to the first and the second items are made on the same 5-point Likert scale (1 = always, 2 = often, 3 = sometimes, 4 = occasionally, 5 = never). For the third question, the following 5-point Likert scale is offered: 1 = not at all, 2 = occasionally or not very often, 3 = sometimes, 4 = very often,

5 = always. The SBSQ scores range from 3 to 15, with 3–9 seen as inadequate, 10–12 as marginal, and 13–15 as adequate (Chew et al., 2008; Ylitalo et al., 2018).

Perceived Discrimination. Evaluation of perceived discrimination was based on the Everyday Discrimination Scale (EDS), a nine-item self-report scale that reflects feelings and beliefs about experiencing discrimination in daily life (Williams et al., 1997). This scale, the most widely used measure of perceived discrimination in studies of health and well-being, assesses discrimination as a chronic daily stressor that cumulatively contributes to poor health. Its nine items are as follows: (Item1) You are treated with less courtesy than other people are. (Item 2) You are treated with less respect than other people are. (Item 3) You receive poorer service than other people at restaurants or stores. (Item 4) People act as if they think you are not smart. (Item 5) People act as if they are afraid of you. (Item 6) People act as if they think you are dishonest. (Item 7) People act as if they're better than you are. (Item 8) You are called names or insulted. (Item 9) You are threatened or harassed.

The EDS has shown acceptable psychometric properties and high levels of validity and reliability in diverse samples. Internal consistency for the EDS was acceptable, with a Cronbach's α of 0.88 and a McDonald's ω of 0.85. (Fazeli Dehkordy et al., 2016; Gonzales et al., 2016). Participants responded on a 6-point Likert scale (1 = never, 2 = less than once a year, 3 = a few times a year, 4 = a few times a month, 5 = at least once a week, 6 = almost every day). The mean summary ranged from 1 to 54, with a higher summary score indicating a higher frequency of perceived discrimination. The summed scores for a final scale ranged from 9 to 54 (mean 16, SD 6.6, alpha = 0.91).

Scores were classified into three levels of perceived discrimination: low (9–15), medium (16–22), and high (23–54; Hahm et al., 2010).

Need Factors. Need factors were represented by self-reported health conditions and health-related quality of life (Stein et al., 2012). Health conditions were captured by a health questionnaire regarding absence or presence of 21 possible serious health conditions, including smoking. This tool was adapted from the REDCap Health Questionnaire. Scores were summed to assign each participant a Medical Condition Score ranging from 0 to 21, with a higher score indicating a greater number of medical condition and a greater need.

Another self-report health status instrument is the 12-Item Short Form Health Survey Version 2 (SF-12v2), a well-known generic measure of health-related quality of life. Evidence regarding the reliability and validity of the SF-12v2 has shown it to have good psychometric properties. The instrument has since been evaluated for use among general populations as a way of evaluating overall community health status as well as the health status of minority ethnic groups (Shah et al., 2018; Younsi & Chakroun, 2014). The SF-12v2 is an abbreviated version of the SF-36 Health Survey. Both the SF-12v2 and the SF-36 have the same number of subscales, but the SF-12v2 has fewer items per subscale. The SF-12v2 comprises eight subscales that form a health profile: physical functioning, role physical, bodily pain, general health, vitality, social functioning, role emotional, and mental health. These eight subdomain scores are summarized into two section scores: physical component summary (PCS), representing physical health, and mental component summary (MCS), representing mental health. The standard PCS and MCS scores for the general U.S. population for the SF-12v2 average

50 (*SD* = 10), with higher scores indicating better self-reported health status (Ware et al., 2007).

Quantitative Data Analysis

We used descriptive statistics (e.g., frequencies, percentage, means, and standard deviation) to organize and prepare the data analysis. Univariate and multivariate logistic regression analyses were conducted to examine the relationship between each predictor variable and the outcome variables (HSU and medication adherence). Unadjusted odd ratios with 90% confidence intervals were calculated to facilitate interpretation of the relative magnitude of effects. In the final model analysis, hierarchical logistic regression was utilized to test the predictability of the predictor variables within a group structure (predisposing, enabling, and need factors) and the outcome variables (HSU and medication adherence). The $p < 0.1$ level was used for statistical significance.

Logistic Regression. Binary logistic regression analysis was used to examine the strength and direction of the predictor variables associated with the study outcomes (see Table 3.1). The study outcomes included three dependent variables: outpatient visits, preventive care utilization, and medication adherence. All dependent variables were dichotomous (yes or no response). The first outcome, HSU, included two dependent variables: outpatient visits and preventive care utilization. The yes response group of logistic regression for each dependent variable included participants who answered yes on the HSU questionnaire items. For the second outcome, medication adherence, only participants on prescribed medication were considered. The yes response group of logistic regressions included optimally adherent participants (participants who scored

more than 7 on the MMAS-8 scale), whereas the no response group included participants who had suboptimal levels of adherence (0–7on the MMAS-8 scale).

Mathematically, and for the purposes of the data analysis, the overall research question followed the general model

$$\text{Logit}(p) = \beta 0 + \beta i \text{ Predisposing} + \beta j \text{ Enabling} + \beta \text{k Need} + \theta$$

where Logit (p) was the logit of the probability of outpatient visits, preventive care utilization, or medication adherence; $\beta 0$ was the independent term; βi, βj, and βk were regression coefficients of the independent variables; and θ was a normally, independently distributed error term.

Table 3.1
Logistic Regression Analysis

Predictor Variables	Binary logistic regression	Hierarchical logistic regression	Description *
Predisposing (Age, gender, education, employment status, relationship status, country of origin, length of Stay, place of birth, parent place of birth, religion status, religious beliefs, refugee status, beliefs about medicines)	$Y = \beta_0 + \beta_i$ *Age…*	$Y = \beta_0 + \beta_i * Predisposing$	i=1…13
Enabling (Income, health insurance, health literacy, perceived discrimination)	$Y = \beta_0 + \beta_j$ *Income…*	$Y = \beta_0 + \beta_i * Predisposing + \beta_j * Enabling$	i=1…13; j=1…4
Need (Self-reported health conditions, health- related quality of life)	$Y = \beta_0 + \beta_k$ *Self-reported health conditions …*	$Y = \beta_0 + \beta_i * Predisposing + \beta_j * Enabling + \beta_k * Need$	i=1…13; j=1…4; k=1, 2

The assumptions of this model were as follows: Observations were independent of one another, with groups of categorical variables being mutually exclusive; there were no significant associations between independent variables; and there was a linear relationship between the independent variables and log odds.

Table 3.2
Research Questions and Analysis Method

RQ Number	Research Question (RQ)	Analysis Method
RQ 1	How do focus groups comprising members of ADAs communities help extend our understanding of the health status and related risk factors among ADAs in South Florida, and they explain the impact of health literacy besides perceived discrimination on HSU and medication adherence?	Semi-structured focus groups
RQ 2	To what extent are predisposing (e.g., age, gender, relationship status, place of birth, and length-of-stay) enabling (e.g., income, health insurance, health literacy, perceived discrimination), and need factors (e.g., self-perception of illness (or self-perceived illness), illness diagnosis) associated with ADAs' HSU and medication adherence?	
	Hypothesis 1. All variables considered as part of ABM under the three different domains (predisposing, enabling, and need factors) would be significantly associated with HSU and medication adherence.	Binary logistic regression
	Hypothesis 2. Based on the ABM, the following sets of predictors would be significantly associated with HSU and medication adherence: (Model 1) predisposing factors, (Model 2) predisposing and enabling factors, and (Model 3) predisposing, enabling and need factors.	Hierarchical logistic regression.
RQ3	How does a mixed-methods approach, as employed here, expand the current knowledge of HSU and medication adherence of this population? Furthermore, how does this synergistic approach broaden our understanding of the various aspects underlying the health outcomes of this population?	Binary and Hierarchical logistic regression, Semi-structured interview

Human Subject Considerations

Institutional Review Board (IRB) approval from NOVA Southeastern University was obtained for both phases (IRB #: 2018-188). Participants were deidentified and required by IRB policy to complete a form documenting their informed consent.

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Summary

Several analytic approaches were incorporated into the proposed mixed-method study to explore the impact of health literacy level and perceived discrimination on HSU and medication adherence outcomes for ADAs in South Florida. First, ethnographic focus groups were analyzed. Second, descriptive statistics were performed for all variables to summarize the data obtained during the quantitative phase. Third, analysis of all variables as part of ABM under the three different domains (predisposing, enabling, and need factors) was included in a binary logistic regression analysis. Four, the underlying outcomes were examined within a hierarchical logistic regression analysis. Fifth and last, by relying on both quantitative and qualitative methods, a synergistic approach was employed (Table 3.3). In the next chapter, results of all emergent themes and codes from ADA focus group sessions are presented and explained. In addition, all statistical analyses are displayed and discussed in terms of their statistical significance, based on the research questions and hypotheses.

Table 3.3
Mixed-Methods Sequential Exploratory Design

Phase	Procedures	Product
Qualitative Data Collection	Focus group sessions	Focus group transcripts
Qualitative Data Analysis	Analysis with NVivo12	Themes and Codes
Connecting Qualitative and Quantitative Phases	Using the information in the designed instrument	Selection instruments for the survey
Quantitative Data Collection	Online self-administrated survey	**Predisposing factors** •Socio-Demographics (e.g., age, gender, relationship status, country of origin) •Health beliefs about medication: Beliefs in Medications Questionnaire (BMQ) **Enabling factors** •Personal (e.g., income, health insurance) •Perceived discrimination: Everyday Discrimination Scale (EDS) •the level of Health literacy:The Newest Vital Sign (NVS), Chew's Set of Brief Screening Questions (SBSQ) **Need factors** •Self- reported health conditions •Health related quality of life (*The Short Form Health Survey (SF-12 V2)* **Medication Adherence** •The self reported (Morisky Medication Adherence Scale-8) **Healthcare services utilization** •Last 12-month healthcare services utilizations (outpatient visits, preventive care)

Table 3.4
Mixed-Methods Sequential Exploratory Design Continued.

Phase	Procedures	Product
Quantitative Data Analysis	SPSS	Descriptive statistics Binary logistic regression analysis was used to examine the relationship between each predictor (predisposing, enabling, and need factors) and the dependent variables (outpatient visits, preventive care utilization, medication adherence). Hierarchical logistic regression analysis: First: Predisposing factors (e.g., age, gender, education, employment status, relationship status, country of origin, length of stay, place of birth, parent place of birth, religion status, religious beliefs, refugee status, beliefs about medicines) were entered in the model. Second: After controlling for predisposing factors, enabling factors (e.g., income, health insurance, health literacy, perceived discrimination) were entered in the model. Third: After controlling for predisposing and enabling factors, the need set of factors (e.g., self-reported health conditions, health- related quality of life) were entered last in the model.
Integration of Qualitative and Quantitative	Interpretation and explanation of quantitative and qualitative results.	Discussion

Chapter 4

Results

This mixed-method study explored the impact of health literacy level and perceived discrimination on healthcare utilization services and medication adherence among ADAs in South Florida. This chapter is divided into three sections that answer the proposed mixed methods analysis research questions. First, I expand on emergent themes and codes from ethnographic focus groups of 27 ADAs. Second, I address the demographic and study outcomes characteristics described for 210 ADAs in South Florida. Finally, I address the relationship between predictors derived from the ABM (predisposing, enabling, and need factors).

Phase I Qualitative Analysis

As illustrated in Chapter 3, the qualitative phase relied on the analysis of focus group sessions using the qualitative data management software program NVivo12. Based on prior literature, qualitative data analysis concludes when themes and categories from the data become repetitive and redundant (Creswell & Creswell, 2017; Polit & Beck, 2004). Participants' narratives from focus group sessions were examined in response to the interview guide. In addition, understandings of the health status and the related risk factors (e.g., health literacy, perceived discrimination) of the study outcomes were explored for emergent themes.

Participants' demographic characteristics are described hereafter, followed by a description of the themes that emerged during the interviews, with excerpts from participant narratives.

Qualitative Demographics

As Table 4.1 shows, 27 of 42 eligible individuals were contacted and agreed to participate in the study. Nineteen participants were female (70.0%) and eight male (30.0%). Most participants had at least a high school diploma. Their age ranged from 18 to 60 years, with a mean of 36 years. Ten participants (37.03%) were born in the United States and were considered second-generation (U.S.-born children of foreign-born parents), whereas seventeen other participants (62.9%) reported several Arab countries as their country of origin. Almost half the participants had lived in the United States for 20 years or longer. None of the participants had parents who were born in the United States, and only one participant reported refugee status. Participant characteristics are listed hereafter.

Focus group sessions offered a rich portrait of some factors that could affect HSU and medication adherence among ADAs in South Florida. Data analysis of the transcribed sessions followed standard techniques for thematic identification and coding. Themes and codes were developed based on the narratives provided by participants' responses to the questions included in the focus group interviewee guide. These questions were tailored based on the ABM's predisposing, enabling, and need-based factors. Two key analytical techniques, word repetition and key-words-in-context, were used to abstract the narrative's latent meaning (Graneheim & Lundman, 2004; Vaismoradi et al., 2013).

Table 4.1
Characteristics of The Qualitative Sample

Variable	Percent %	Frequency (27)
Age (years)		
18 to 29	40.74	11
30 to 39	25.93	7
40 to 49	25.93	7
50 and older	7.41	2
Gender		
Male	29.63	8
Female	70.37	19
Living in the U.S. (years)		
1 to 9	18.51	5
10 to 19	33.33	9
20 +	48.15	13
Origin of birth		
Arabic countries	62.96	17
U.S.	37.03	10

Qualitative Descriptive Findings

Discussions between the investigator and the chair of the dissertation committee yielded agreement on how to sort themes and codes. Six major themes emerged within minor subcategory themes that shed light on factors that could impact patterns of HSU and medication adherence among ADAs in South Florida. These themes were revised to finalize codes. Table 4.2 outlines the resulting themes.

In qualitative research, data may be displayed by selecting key quotes, building tables, or using diagrams to display theories that emerged from the study (Flick, 2013; Verdinelli & Scagnoli, 2013). As displayed hereafter, data were grouped and displayed

by selecting key quotes that reflected major themes found to have emerged from the focus group session interviews.

Table 4.2
Qualitative Themes Findings

Themes	Major categories	Minor categories
Predisposing Factors	Characteristic of the Arabic culture	Religion Family Gender Differences Generational Differences
Enabling Factors	Access and insurance Health literacy Perceived discrimination	
Need Factors (General Health)	Physical Health Mental Health	Proactive behaviors Reactive behaviors Stigma

Predisposing Factors

Several themes were identified under the predisposing factors that could impact patterns of HSU and medication adherence, including the characteristics of Arab culture, the role of religion, the role of family, and different characteristics among groups, such as gender and generational differences.

The Characteristics of Arab Culture. The characteristics of Arab culture were a major theme emerging in all focus group sessions. Remarkable diversity exists in the Arab world, which includes a variety of people from different ethnicities, religions, skin color, and cultural backgrounds; sometimes these variations can be seen within the same country. Participant 06 said, “There are a lot of countries in the Arab world . . . . But Arabs have very big culture.”

These variations are present in ADA communities in the United States and could influence their health outcomes. Participant 03 said,

> It depends on where you are culturally. Certain places in certain regions within the same country will put more emphasis on things and women's health. On the other side, there are areas where you need to care about this right away because you have to take care of the whole entire family. So, again, culture does play a role.

Furthermore, the focus groups illustrated the diversity of ADA communities across different regions within the United States, with health behavior largely depending on where they resided in the United States. Participant 05 said,

> I think ADAs are different within the U.S. among different states and it depends on the health trend and surrounding environment. Look at ADAs in Northern states. I look at relatives over there and they don't care about preventative healthcare at all, even the doctor's visits.

The Role of Religion. ADAs have a variety of religious affiliations, beliefs, and practices. However, the value of religion is fundamental and shared across ADA communities. Adherence to religion has an essential role in the ethnic identity of individuals as well as within their family life, behaviors, customs, and traditions. Religion is a highly interwoven factor in Arab culture. One of the participants said, "The fact is whether we like to admit or not that cultural practices and tradition are so intertwined with religion where we come from." Another said, "They are all intertwined, you don't know where the line of religion stops, and tradition starts." Another participant emphasized the role of religion in Arab culture: "Almost a religion in their culture."

However, other Arab individuals may have different perspectives of detachment from religion in their life. One interviewee said, “I believe culture and religion are two different things; however, Arab countries make them one thing, which they are not.”

Additionally, religion could play an important factor in ADAs’ health and care-seeking behavior. Being healthy had an association with religion in some participants’ perspectives on health. Following religious rules drives the health behavior of ADAs. Participant 06 said, “You have to practice your religion and be proactive towards your health. You also have to find out what is needed to help yourself.” Participant 25 said, “Health is spiritual, mental, and physical, which is related to religion sometimes.” Participant 05 said, “In our religion does prescribe for being proactive when it comes to your health.”

Discussion with participants showed that religion and being spiritual have an association with psychological well-being. Most participants affirmed that religion plays an essential role in being healthy. Participant 02 stated, “The spirituality helps, whatever your religion is, to bring peace to yourself. So, there is more than one factor. Maybe we focus on physical or mental health, but other factors that might affect our health as well.” Participant 06 said, “Spirituality is a great point. As Muslims versus other religions within the Arab world, we have a great religion that actually does help you maintain your health. It encourages you to be healthy . . . .”

In addition to the health benefits, dress code is a fundamental issue within the ADA community. The *hijab*, for example, which women wear to cover their head, attracts more attention to their identity as Muslim ADAs, so that they are more likely to perceive discrimination and experience a high level of psychological distress. Participant

06 said, “So, the scarf is a whole other topic and I think in America it’s not needed because it causes more attention. It draws more attention to you and more discrimination.” Participant 07 said, “When I am wearing the headscarf . . . I feel that dismissal a lot from the healthcare professionals . . . and I assume that maybe at times it might be the cultural attire that could create attention.”

Discrimination and psychological distress have also impacted men who are with women relatives wearing *hijab*s. Male Participant 02 said, “I never felt that feeling until I got married here. Most of the time, when I go outside, my wife is anxious. People look at her. She is anxious regarding people treating her well, as well as me.”

The Role of the Family. Arab culture is characterized by an emphasis on collectivism. Family is a predominant influence on the individual behavior of Arabs, specifically in the context of health. ADA families provide a supportive form of social assistance, which to some extent serves as a proxy for professional intervention (Amer & Awad, 2015). Participant 01 pointed out, “I like the way that we are family, and sometimes you can go to your sister or good friend and she can recommend you do something, and not go to therapist or doctor.”

Differences Within ADAs. ADA society sets expectations for gender roles of males and females, which are constructed to guide behaviors. Historically, Arab culture is a patriarchal one, in which males play the primary and dominant role in the family. Women are often expected to maintain family unity and privacy by focusing on caregiving and nurturing. Stepping outside these traditional roles places ADA women in challenging positions and risks denunciation by their family-centered communities (Amer

& Awad, 2015). Participants emphasized variations between women and men toward health. Participant 26 said,

> There is a difference between genders because sometimes when a boy acts out, it's like boys will be boys . . . but if a girl is acting a certain way, then she's showing some symptoms. We are more likely to seek help for girls than for boys.

Male Participant 22 said, "The same kind of mentality and challenges still exist. For example, my father is very old school. I was allowed to go away to college while my sister was not."

The discussion indicated that gender roles influence health-seeking behavior and HSU. Participant 05 said,

> There is a cultural stigma for female health. More specifically, unmarried women. For example, going to a gynecologist just for a general female healthcare checkup. It doesn't look right for them to go to a gynecologist, even if no one will find out.

Additionally, the discussion showed that generational differences could impact patterns of HSU and medication adherence. Some ADA elderly are not concerned about their health or their health behavior. For example, some women from older generations prioritize their children and husband's health over their own well-being. Participant 07 said,

> I look at the older generation of women, and it wasn't a priority for them to go for physical exams, take care of their health and exercise. Because they had other responsibilities, it's as if the healthcare of their children, their husbands, or their surroundings was more important than themselves. So, I am hoping with time this

> disappears. It's important for everybody to be at their highest and best health, whether you are a female or male child or adult.

In this regard, Participant 03 said,

> Also, for older people depending on how old you are—like, if it's our parents for example, then going to the doctors almost impossible and they relate that to religion. "If I am sick God will cure me." They will wait until the very end they will wait and wait and wait so, it depends on the age.

Participant 20 added, "I agree with you about generations, like within the Arabs I think the younger generation now even like our parents, everyone is more health-conscious and I think it's an international thing right now." Participant 15 then said,

> I think there is a generational gap. So, if you ask of my Dad, it was reactive; he was overweight, then he almost loses his foot from being diabetic. So, all of his subsequent measures were reactive as a result of this, but I think as the younger generation and the kids raised here, we are more proactive and taking preventive measures like yoga, going to the doctor, and eating well. So, I think that you have to take into consideration the generation.

Enabling Factors

The current study focuses on the importance of access and barriers to HSU and medication adherence with specific attention to the effects of health literacy and perceived discrimination.

Access. As the ABM suggested, participants in the study noted that their lack of access to healthcare services could affect their pattern of HSU and level of medication adherence. Participant 07 said,

> There are different health insurance and different aids from the government like Medicaid. You need to have a certain immigration status to get the benefits. A lot of people are not able to get the right insurance so they can't see the doctor, do annual check-ups, or be proactive with their health.

Participant 26 said,

> My husband now does need the insurance. Last week he had a pain in his back, and I told him just to go to the emergency room because we don't have the insurance. So, that was the reason why he didn't go to the doctor because he didn't have insurance.

Participant 05 said, "Living in the U.S., and I did live abroad as well, access to healthcare is very available here, but financially for many people is not."

Regarding the impact of health insurance availability on health outcomes, Participant 08 said,

> I think we built habits over time, and for immigrants that just came to America and don't have healthcare insurance, they don't really go for a check-up. They are not going to the doctor as often. So, when they do end up getting healthcare insurance, sometimes that habit sticks with you, and you push things off or not go to the doctor right away because you feel like "Well, I've last this long" kind of thing. It's kind of harder for you to be motivated or to see the importance of going for an annual check-up and being more preventive when you did not have healthcare insurance for a while.

Health Literacy. Participants indicated that several factors, such as health literacy, language, patient and physician concordance, and discordance, negatively affect

HSU and medication adherence. Participant 08 said, “I would say it is language barriers. I think language barriers are a big issue. I work with a lot of Syrian refugees, and they’re here for just a few months; so, they haven’t acquired the language yet.” Participant 19 said, “So, we have to be taught or learn what type of sickness could be observed earlier so we can take action. I don’t have to go to university and study how to be healthy and do healthy stuff.”

Health literacy regarding medications has special consideration among ADA participants. From the discussion, ADAs rely on self-care behavior therapies, either to prevent illnesses or to treat them. Many of these therapies were not prescribed or recommended by a healthcare professional. Commonly reported methods used at home to relieve pain included home remedies (e.g., herbal tea) and over-the-counter pain medications such as Tylenol and Advil. In addition, ADAs’ culture could influence their attitudes toward medical care; their ability to understand, manage, and cope with the course of an illness; their understanding of a diagnosis, and the consequences of their medical treatments. They had specific ideas and values related to beliefs about medication and treatments.

Participant 03 stated, “I want you to have an open mind when it comes to herbal treatment sometimes . . . . It’s always ‘Let’s try this within 24 hours, and if that doesn’t work, we are running to the hospital or doctors.’” The same participant also said,

> If you go to my house, I just have Aleve now because my son gets some headaches . . . . I don’t have to take all the pain medications that the doctor gives me . . . I don’t know the effects long-term.

Participant 08 said, “I think some Arabs have a lot of home remedies for stuff. Like my Mom thinks, ‘tea’ can cure anything. Like, whatever, it is, ‘Just drink some hot tea, and you will be okay.’” Participant 05 then said, “Just because I go to the doctor, that doesn’t necessarily mean that I will take all the medication that they prescribed.”

Based on participants’ responses, literacy regarding antibiotic usage requires specific attention. ADAs use antibiotics prescribed at the clinic or purchased without a prescription in their home country. Antibiotics are used to minimize pain and inflammation, the better to avoid visiting doctors and the expense of seeking healthcare services. Participant 06 said,

> I have noticed that here in the U.S. it’s very strict and what kind of prescription medication you can get. Overseas, for example, in my home country, you could get an antibiotic from the pharmacy if you explain certain symptoms. So, I know newcomers here would say “I brought these antibiotics with me” because the cost here to go a doctor and get a prescription through the pharmacy will cost them a lot more. So, it’s almost like they’re seeking alternate ways of getting the medication.

Participant 07 said, of antibiotic usage without a prescription, “I think it’s truly the lack of education.”

Perceived Discrimination. Participants reported increased experiences of discrimination, especially post-9/11 and with the new president’s campaign, in the form of negatively affected perceptions of them. They felt unwelcomed and accused of being terrorists and felt inferior as citizens. Some ADAs changed anything that would identify them as belonging to ADA groups, including their Arabic name, to avoid prejudice.

Muslim female ADAs were more likely to experience stereotypes and perceived discrimination due to their wearing of *hijab*s. Participant 21 said, “When I saw Trump came out and started campaigning for president, it’s like Trump took up all the racist out of everyone . . . like they could walk past me and be like a terrorist.” Participants 07 said, “I didn’t wear the headscarf on myself I actually put it on two weeks after 9/11. However, my husband was against it, my father was against it. It was not the right choice.”

Participant 22 said,

> My brother called me [not Arabic name] just to fit in. The side of my last name is [Arabic name], and when people see that last name, they switch. People were laughing at my sister when she tried wearing a *hijab* at school. We were the only Muslims in the entire county. And she was abused for it.

Participant 19 said, “Discrimination becomes a big topic around the world. There are regulations and penalties. However, I still felt it here in the USA. I have been here for more than six years, and I felt it three or four times.” Participant 02 said, “Sometimes, the name can also play a role. My advisor once told me, ‘Would you like to change your Arabic name?’”

Need Factors

General Health. Participants shared their understandings of health, including physical, mental, and spiritual well-being. Participant 12 said, “Being healthy to me is working out, and eating healthy.” Participant 22 said, “For me, health is more physical. I think it is physical to me because it involves a balanced diet, a balanced lifestyle, and exercise.” Participant 14 said, “To me, like the others, health is diet, exercise and a healthy mental state of mind. It is a good balance.”

Participants' response to physical health varied by generational status, as already noted. Older generations seemed to be more reactive toward their illness and health conditions, whereas the second and third generations were more proactive and serious about preventive health screenings. Elderly Participant 03 said, "What does be healthy mean to you? Stay away from the doctor."

Some ADAs feel anxious about healthcare services utilization because of the possibility of receiving further unanticipated diagnoses of illnesses. Participant 10 said, "No, I don't like doctors. I hate being there because when you go to the doctor, they check you for something, and they find other things." Participant 04 said, "My parents, for example, they don't like going to the doctor, I think mostly because they're worried about what the doctor might find, mostly with my mom. I think it's more out of anxiety."

Mental Health. In light of ADAs' health perceptions, the concept of psychological well-being among ADAs is of paramount importance. Many ADA participants emphasized the importance of mental health status's influence on life and overall health. Participant 17 said,

> I think that mental health is like the top of health. You can have no medical issues, but if your mental health is not there, it can throw everything completely off. Whether you're stress-free or you're able to handle things.

Participant 24 said, "The mental health depends on the way you perceived things in your mind that it is very important." Participants revealed that ADAs experience several risk factors (e.g., acculturation stressor, immigration, perceived discrimination) that affect or contribute to coping stress and diminish mental well-being. Participant 16 said, regarding the influence of these risk factors on mental health, "That's why we are all unhealthy."

Although the concept of mental health is an important part of ADAs' perception of well-being, severe stigma was associated with mental health issues and medications and HSU. Participants mentioned stigmas associated with any expression of symptoms associated with mental health issues, noting that this is a taboo in ADA culture. Participant 04 said, "Especially in our community, that's on the back burner, no one talks about it, no one wants to think about it. Everyone just focuses on their physical health." Likewise, Participant 03 said, "Mental health is traditionally not discussed." Participant 05 said, "I want to add to that if you complain about your mental health people say, just go to the gym, pray, meditate, and you will be fine." Participant 24 expressed that "Mental health is a taboo; people are like, 'Oh my god, don't tell anybody.'" Likewise, Participant 21 said, "Definitely mental health is a taboo."

In ADA culture, having a mental health illness implies a lack of self-control and may produce shame and guilt in the individual, making ADAs reluctant to discuss signs and symptoms of mental health issues or depression. Participants mentioned that some ADA parents, especially women, were afraid to express mental health issues, fearing that doing so would adversely affect their children and others' perceptions. Participant 21 said,

> I think a lot of Arabic women suffer in silence from mental health. I think a lot of women, and I'm not excluded, other men. I think you don't want to be called crazy. And you don't want to have these labels thrown on you. You don't want to have kids that think you are not mentally stable. And then you fear your kids will be taken from you. If you go to the doctor, they already see you like an Arab and Muslim, and all these other factors. So, there's that fear not only from its own

> community but from social services and from the American stereotypes of what a Muslim family is. So, that fear of the precaution if you reveal that you're suffering from mental health issues is outweighs your desire to get the treatment in my opinion of mental health.

The discussion showed the existence of a stigma associated with psychological medication adherence, so that ADAs were more likely not to adhere to psychological medication prescribed for their mental health issues. Participant 07 said,

> I would say there are some cultural restrictions with mental health medication. I know somebody whose doctor wants her to be on antidepressants for a different mental issue, and she hasn't begun the medication. I'm trying to explain to her you don't have depression, but you need the antidepressants for the other health issues that you're having. It's hard for her to accept the fact that she needs to take the antidepressants, and I feel like it's a cultural thing.

Participant 01 said, "Because it is an antidepressant, it's hard to accept taking them." Participant 03 said, "If it was medication for something else, I would have taken it. So, it again is associated with the shame of admitting that I have a mental health issue."

Additionally, seeking healthcare services for mental health could be affected by different factors. The most important factors mentioned included stigma and lack of culturally competent providers. Participant 05 said, regarding the stigma associated with seeking mental health services, "There is a therapy available for the Arab cultures, but people don't seek it." Describing experiences with ADA parents, Participant 03 said,

> Mental health issues traditionally not discussed. I work with children, and it's very difficult for me to recommend any kind of therapy or get a parent on board to try to work with a therapist, even if the services are free.

A lack of culturally competent providers contributed to underutilization of healthcare services. Participant 04 said,

> That's what I think for mental health specifically. I think another reason why Arabs don't seek out mental health services is that they don't think mental professionals will understand what they're going through because there's not very many Arabs or Muslim mental health professionals.

Likewise, Participant 08 said,

> [W]hen Arabic persons go to any mental health professionals, he or she is assuming that the doctor or the therapist doesn't understand what they're truly going through. Most of the time, there are non-Arabs and non-Muslim therapists, and a lot of questions are based on culture and religious experiences, so that they can understand their Arab and Muslim patients.

Phase II Quantitative Analysis

The quantitative phase data was based on an online self-administrated survey for ADAs. It took place from September 2019 to April 2020. Before analysis, the data were examined for accuracy and omission of values.

Descriptive Statistics

The final sample size for the quantitative phase of the study was 210 participants. The primary demographics from survey respondents were presented following the order of ABM domains (predisposing, enabling, and need factors) and outcome variables

(outpatient visits, preventive care utilization, and medication adherence). For the purpose of this analysis, outcome variables were categorized as dichotomous variables (yes/no). Analysis of the HSU outcome was based on the use of services within the preceding 12 months, whereas analysis of the medication adherence outcome was based on participants' having taken prescribed medication within the preceding 12 months and with an optimal level of adherence.

Predisposing Factors. Table 4.3 gives the predisposing characteristics of the 210 participants. Mean age was 34 years, and the 18–29 age group was the largest. Women constituted two-thirds of the study sample. In addition, most study participants reported a college graduate education. Palestinians were the largest group in the sample. Nearly a third of participants worked full-time, with the other third students or unemployed. Mean length of stay in the United States was 16.52 years. More than half of participants had not been born in the United States, nor had most of their parents. Slightly more than half were in a relationship. Most were Muslim, and more than a third (36.7%) considered themselves deeply religious. Three-quarters reported a nonrefugee immigrant status. For the medication adherence outcome, the mean of the beliefs about medicine scale was 21.8 (from a possible range of 8–40, SD = 6.38).

Table 4.3
Characteristics Based on Predisposing Factors

Predisposing variables		Frequency	Percent %
Age (years)	(M:34; SD:14.1)		
	18-29	103	49.0
	30-49	71	33.8
	50 and older	36	17.1
Gender			
	Male	80	38.1
	Female	130	61.9

Table 4.3

Characteristics Based on Predisposing Factors Continued

Predisposing variables		Frequency	Percent %
Education			
	High school and less	35	16.7
	College and more	175	83.3
Country of Origin			
	Palestine	68	32.4
	Syria	33	15.7
	Egypt	30	14.3
	Saudi Arabia	27	12.9
	Jordan	12	5.7
	Lebanon	9	4.3
	Sudan	8	3.8
	Iraq	5	2.4
	Others	18	8.5
Employment status			
	Student/ Unemployed	89	42.4
	Occasional Work/ Retired/Self-employed/Part-time	60	28.6
	Regular Full-Time Work (30 or More Hours/Week)	61	29.0
Length of Stay (years) (M:16.52; SD: 10.04)			
Place of birth			
	Other countries	130	61.9
	U.S.	80	38.1
Parent place of birth			
	Other countries	192	91.4
	U.S.	18	8.6
Relationship status			
	Single	91	43.3
	Married	119	56.7
Religion status			
	Muslim	203	96.7
	Other affiliation	7	3.3
Religious beliefs			
	A little religious	34	16.2
	Somewhat religious	99	47.1
	Deeply religious	77	36.7

Table 4.3
Characteristics Based on Predisposing Factors Continued

Predisposing variables	Frequency	Percent %
Refugee status		
Non-refugee immigrant	184	87.6
Refugee immigrant	26	12.4
Beliefs about medicines		
Overall (M:21.85; SD:6.38)		

Enabling Factors. Table 4.4 lists the enabling characteristics of the sample. Almost half the sample (*n* = 94) reported an income of $40,000–$79,999. Two-thirds had health insurance (*n* = 159). Slightly more than half had adequate health literacy and reported a low level of perceived discrimination.

Table 4.4
Characteristics Based on Enabling Factors

Enabling Variables	Frequency	Percent %
Income		
$0- $$39,999	74	35.2
$40,000 - $79,999	94	44.8
$80,000 or more	42	20.0
Health insurance		
No	51	24.3
Yes	159	75.7
Health literacy		
The Newest Vital Sign (NVS)		
Limited /Possibility health literacy	88	41.9
Adequate health literacy	122	58.1
Chew's Set of Brief Screening Questions (SBSQ)		
Limited /Possibility health literacy	80	38.1
Adequate health literacy	130	61.9
Perceived discrimination		
Everyday Discrimination Scale (EDS)		
(M:17.34; SD:9.4)		
Low	121	57.6
Medium/ High	89	42.4

Need Factors. Table 4.5 lists the need characteristics of study participants. More than half of respondents (57.1%) reported an absence of any health conditions. For health-related quality of life, the means of the physical and mental components were 50.89 and 46.1, respectively.

Table 4.5
Characteristics Based on Need Factors

Need Variables		Frequency	Percent %
Self-reported health conditions			
	No Conditions	120	57.1
	One and more conditions	90	42.9
Health- related quality of life			
	Physical SF-12 (M:50.89; SD:6.4)		
	Mental SF-12 (M:46.1; SD:6.9)		

Outcome Variables. The purpose of this study was to explore the impact of health literacy level and perceived discrimination on HSU and medication adherence outcomes for ADAs in South Florida. The HSU outcome variable was defined by having received healthcare services (outpatient visits and preventive care utilization) within the preceding 12 months. This information was obtained by the following question about outpatient visits: "In the past 12 months, how many visits did you make to a doctor or nurse practitioner for a physical health problem. Do not count times when you only picked up medication or when you saw a doctor when you were hospitalized." Data on preventive care utilization were gathered using the following question: "During the last 12 months, did you do any preventive cancer screening (i.e. a breast exam, a pap smear, a colorectal (colon)?" For purposes of analysis, this variable was categorized as having received healthcare services within the preceding 12 months for the yes response group and as not having received any healthcare services within the preceding 12 months for the

no response group. Analysis of HSU was based on the yes response for utilization of healthcare services (outpatient visits and preventive care utilization) within the preceding 12 months.

The second portion of the study assessed medication adherence. Only participants on prescribed medication were considered for this analysis. The yes response group included participants with a high adherence level (optimal adherence)—those who scored more than 7 on the MMAS-8 scale—whereas the no response group included low and medium adherent (suboptimal adherence) participants: those who scored 0–7. Analysis of medication adherence was based on participants with optimal adherence levels.

As Table 4.6 shows, the majority of participants (n = 142) reported at least one outpatient visit, but the majority of respondents did not use preventive care services (n = 144). Only 54.7% of participants were taking prescribed medications, with two-thirds of them 74.8% reporting suboptimal adherence to their prescribed medication. Nearly 25.2% of the sample reported an optimal adherence level.

Table 4.6
Characteristics Based on The Outcomes

Outcomes variables	Yes (*Optimal Adherence*)		No (*Suboptimal Adherence*)	
	Frequency	Percent %	Frequency	Percent %
Outpatient visits (n=210)	144	68.6	66	31.4
Preventive care (n=210)	66	31.4	144	68.6
Medication adherence (n=115)	29	25.2	86	74.8

Quantitative Research Questions

(Question 2). To what extent are predisposing (e.g., age, gender, education, length of stay, place of birth, religious beliefs, beliefs about medication), enabling (e.g., income,

health insurance, health literacy, perceived discrimination), and need-based (e.g., self-perceptions of illness, illness diagnosis) factors associated with ADAs' HSU and medication adherence?

Findings from Research Question 1 and Hypotheses 1 and 2 are presented hereafter. A significance level of 0.1 was set for all statistical analyses.

Specific Aim. To assess the adequacy of ABM (predisposing, enabling, and need factors) so as to explain HSU and medication adherence in the study population.

Hypothesis 1. All variables considered part of ABM under the three different domains (predisposing, enabling, and need factors) would be significantly associated with HSU and medication adherence.

A binary logistic regression was performed to estimate the association between the predisposing, enabling, and need factors and the outcome variable (HSU, medication adherence; see Table 4.7).

Table 4.7
Binary Logistic Regression

Predictor Variables	Equations	Description
Predisposing (Age, gender, education, employment status, relationship status, country of origin, length of stay, place of birth, parent place of birth, religion status, religious beliefs, refugee status, beliefs about medicines)	$Y = \beta_0 + \beta_{i\ Age\ldots}$	i=1...13
Enabling (Income, health insurance, health literacy, self-perceived discrimination)	$Y = \beta_0 + \beta_{j\ Income\ldots}$	j=1...4
Need (Self-reported health conditions, health- related quality of life)	$Y = \beta_0 + \beta_{k\ Self\text{-}reported\ health\ conditions.\ \ldots}$	k= 1, 2

Outpatient Visits

Predisposing Factors. As indicated in Table 4.8, among predisposing variables, length of stay in the United States was statistically significant and was positively associated with outpatient visits (OR = 1.019, 90% CI = 1.019–1.074, $P < 0.04$). Moreover, the parent place of birth variable was statistically significant and was associated with outpatient visits. Members of the third generation (children born in the United States to U.S.-born parents) were less likely to have outpatient visits (OR = 0.329, 90% CI = 0.145–0.75, $P < 0.026$). However, other predisposing variables, such as age, gender, employment status, place of birth, relationship status, religious beliefs, and refugee status, were not found to be statistically significant predictors of outpatient visits.

Table 4.8
Binary Logistic Regression of Outpatient Visits and Predisposing Factors

Independent Variable	OR	P-value	90% Cl
Age (years)		0.574	
18-29	Reference group		
30-49	1.430	0.285	[0.825-2.47]
50 and older	1.682	0.233	[0.821-3.44]
Gender			
Male	Reference group		
female	1.304	0.382	[0.791-2.148]
Education			
High school and less	Reference group		
Some college and more	1.360	0.426	[0.72-2.569]
Employment status		0.774	
Student/ Unemployed	Reference group		
Part-Time/ occasional	0.967	0.924	[0.539-1.734]
Regular Full-Time Work	1.251	0.539	[0.687-2.278]]
Length of Stay (years)	1.019	**0.04**	[1.019-1.074]
Place of birth			
Other countries	Reference group		
U.S.	0.672	0.727	[0.671-1.847]

Table 4.8
Binary Logistic Regression of Outpatient Visits and Predisposing Factors Continued

Independent Variable	OR	P-value	90% Cl
Parent place of birth			
Other countries	Reference group		
U.S.	0.329	**0.026**	[0.145-0.75]
Relationship status		0.202	
Single	Reference group		
Married	1.483	0.188	[0.907-2.425]
Religious beliefs		0.226	
A little religious	Reference group		
Somewhat religious	1.906	0.116	[0.971-3.74]
Deeply religious	1.974	0.112	[0.977-3.989]
Refugee status			
Non-refugee immigrant	Reference group		
Refugee immigrant	1.036	0.938	[0.491-2.184]

Enabling Factors. As shown in Table 4.9, among the enabling variables, income ($P < 0.002$) was statistically significant and was positively associated with having outpatient visits. In short, participants who had more income were more likely to have an outpatient visit. In addition, participants who had health insurance were 4.8 times more likely to have outpatient visits (OR = 4.881, 90% CI = 2.782–8.565, $P < 0.00$). Based on the NVS scale, the health literacy variable ($P < 0.002$) was statistically significant and was positively associated with having outpatient visits. Participants who had adequate health literacy (OR = 2.551, 90% CI = 1.546–4.21, $P < 0.002$) were more likely to have outpatient visits. Finally, perceived discrimination was not found to be a statistically significant predictor of having outpatient visits.

Table 4.9
Binary Logistic Regression of Outpatient Visits and Enabling Factors

Independent Variables	OR	P-value	90% Cl
Income		**0.002**	
$0- $$39,999	Reference group		
$40,000 - $79,999	2.223	0.015	[1.296-3.813]
$80,000 or more	5.100	0.001	[2.245-11.586]
Health insurance			
No	Reference group		
Yes	4.881	**0.00**	[2.782-8.565]
Health literacy			
The Newest Vital Sign (NVS)			
Limited /Possibility health literacy	Reference group		
Adequate health literacy	2.551	**0.002**	[1.546-4.21]
Chew's Set of Brief Screening Questions (SBSQ)			
Limited /Possibility health literacy	Reference group		
Adequate health literacy	1.567	0.138	[0.952-2.578]
Perceived discrimination			
Everyday Discrimination Scale (EDS)			
Low	Reference group		
Medium/ High	0.833	0.542	[0.509-1.364]

Need Factors. As shown in Table 4.10, among the need variables, only self-reported health conditions ($P < 0.000$) was statistically significant and positively associated with having outpatient visits. Participants with at least one condition were around four times more likely to have outpatient visits. However, neither physical nor mental quality of life was found to be a statistically significant predictor of having outpatient visits.

Table 4.10
Binary Logistic Regression of Outpatient Visits and Need Factors

Independent variable	OR	P-value	90% Cl
Self-reported health conditions			
No Conditions	Reference group		
One and more conditions	4.685	**0.000**	[2.627-8.358]
Health- related quality of life			
Physical SF-12	0.972	0.227	[0.934-1.011]
Mental SF-12	1.018	0.410	[0.983-1.054]

Preventive Care Utilization

Predisposing Factors. As indicated in Table 4.11, among predisposing factors, age ($P < 0.000$) was found to be statistically significant and positively associated with preventive care utilization. Older participants had increased utilization of preventive care. The effect of gender was also significant and positive, with female participants 3.5 times more likely to have preventive care utilization (OR = 3.547, 90% CI = 1.989–6.327, $P < 0.000$). Additionally, the variable of length of stay in the United States was statistically significant and was positively associated with preventive care utilization (OR = 0.1066, 90% CI = 0.038–1.094, $P < 0.00$). The effect of relationship status was also statistically significant and was associated with preventive care utilization ($P < 0.000$). Married participants were 2.7 times more likely to have preventive care utilization than single participants (OR = 2.742, 90% CI = 1.612–4.662, $P < 0.002$). Conversely, other predisposing variables, such as place of birth, parent place of birth, religious beliefs, and refugee status, were not found to be statistically significant predictors of preventive care utilization.

Table 4.11
Binary Logistic Regression of Preventive Care Utilization and Predisposing Factors

Independent Variable	OR	P-value	90% Cl
Age (years)		**0.00**	
18-29	Reference group		
30-49	2.258	0.**023**	[1.255-4.062]
50 and older	7.822	**0.000**	[3.856-15.868]
Gender			
Male	Reference group		
female	3.547	**0.000**	[1.989-6.327]

Table 4.11
Binary Logistic Regression of Preventive Care Utilization and Predisposing Factors Continued

Independent Variable	OR	P-value	90% Cl
Education			
High school and less	Reference group		
Some college and more	1.360	0.426	[0.72-2.569]
Employment status		0.837	
Student/ Unemployed	Reference group		
Part-Time/ occasional	1.212	0.594	[0.671-2.189]
Regular Full-Time Work	1.182	0.641	[0.655-2.133]
Length of Stay (years)	1.066	**0.00**	[1.038-1.094]
Place of birth			
Other countries	Reference group		
U.S.	0.672	0.206	[0.401-1.127]
Parent place of birth			
Other countries	Reference group		
U.S.	1.100	0.856	[0.465-2.603]
Relationship status		0.202	
Single	Reference group		
Married	2.742	**0.002**	[1.612-4.662]
Religious beliefs		0.264	
A little religious	Reference group		
Somewhat religious	1.758	0.236	[0.803-3.849]
Deeply religious	2.204	0.104	[0.991-4.901]
Refugee status			
Non-refugee immigrant	Reference group		
Refugee immigrant	1.18	0.709	[0.570-2.44]

Enabling Factors. As shown in Table 4.12, income was a statistically significant predictor of preventive care utilization. Higher income also increased preventive care utilization. Moreover, participants who had health insurance were 3.7 times more likely to have preventive care utilization (OR = 3.709, 90% CI = 1.802–7.632, $P < 0.003$). Finally, neither health literacy nor perceived discrimination was a statistically significant predictor of preventive care utilization.

Table 4.12
Binary Logistic Regression of Preventive Care Utilization and Enabling Factors

Independent Variables	OR	P-value	90% Cl
Income		**0.082**	
$0- $$39,999	Reference group		
$40,000 - $79,999	1.65	0.156	[0.923-2.948]
$80,000 or more	2.515	**0.027**	[1.267-4.99]
Health insurance			
No	Reference group		
Yes	3.709	**0.003**	[1.802-7.632]
Health literacy			
The Newest Vital Sign (NVS)			
Limited /Possibility health literacy	Reference group		
Adequate health literacy	1.538	0.162	[0.927-2.552]
Chew's Set of Brief Screening Questions (SBSQ)			
Limited /Possibility health literacy	Reference group		
Adequate health literacy	1.349	0.337	[0.808-2.252]
Perceived discrimination			
Everyday Discrimination Scale (EDS)			
Low	Reference group		
Medium/ High	0.762	0.372	[0.462-1.257]

Need Factors. The only significant variable associated with preventive care utilization was the self-reported health conditions variable ($P < 0.021$). Participants who had at least one condition were twice as likely to utilize preventive care services than were their well counterparts (see Table 4.13). For the health-related quality of life variable, neither physical nor mental quality of life was found to be a statistically significant predictor of preventive care utilization.

Table 4.13
Binary Logistic Regression of Preventive Care Utilization and Need Factors

Independent variable	OR	P-value	90% Cl
Self-reported health conditions			
No Conditions	Reference group		
One and more conditions	2.00	**0.021**	[1.219-3.283]
Health- related quality of life			
Physical SF-12	0.994	0.80	[0.957-1.032]
Mental SF-12	1.026	0.23	[0.990-1.063]

Medication Adherence

Predisposing Factors. As shown in Table 4.14, among predisposing variables, the age variable was found to be statistically significant and positively associated with optimal medication adherence ($P < 0.006$). Older participants were more likely to adhere to medication than younger participants were. Likewise, employment status was a significant predictor of optimal medication adherence ($P < 0.064$). Participants tended to optimally adhere to medications as they became more involved in their work. Moreover, the length of stay variable was found to be statistically significant and was positively associated with an optimal medication adherence level (OR = 1.070, 90% CI = 1.030–1.111, $P < 0.003$). In short, participants who had been residing in the United States for longer were more likely to have optimal medication adherence. The effect of beliefs about medicines variable was significant and was negatively associated with optimal medication adherence (OR = 0.906, 90% CI = 1.03–1.184, $P < 0.019$). Participants were more likely to have optimal medication adherence as negative perceptions of medication diminished. Other predisposing variables, such as gender, education, place of birth, parent place of birth, relationship status, religious beliefs, and refugee status, were not found to be statistically significant predictors of optimal medication adherence.

Table 4.14
Binary Logistic Regression of Medication Adherence and Predisposing Factors

Independent Variable	OR	P-value	90% Cl
Age (years)		**0.066**	
18-29	Reference group		
30-49	1.875	0.239	[0.780-4.509]
50 and older	3.609	0.020	[1.461-8.915]

Table 4.14
Binary Logistic Regression of Medication Adherence and Predisposing Factors Continued

Independent Variable	OR	P-value	90% Cl
Gender			
Male	Reference group		
female	1.384	0.479	[0.651-2.942]
Education			
High school and less	Reference group		
Some college and more	1.271	0.728	[0.409-3.954]
Employment status		**0.064**	
Student/ Unemployed	Reference group		
Part-Time/ occasional	3.412	0.019	[1.439-8.094]
Regular Full-Time Work	1.750	0.319	[0.695-4.408]
Length of Stay (years)	1.070	**0.003**	[1.030-1.111]
Place of birth			
Other countries	Reference group		
U.S.	1.597	0.285	[0.778-3.280]
Parent place of birth			
Other countries	Reference group		
U.S.	0.988	0.988	[0.246-3.973]
Relationship status		0.202	
Single	Reference group		
Married	1.123	0.793	[0.544-2.320]
Religious beliefs		0.232	
A little religious	Reference group		
Somewhat religious	1.814	0.471	[0.466-7.067]
Deeply religious	3.250	0.152	[0.840-12.57]
Refugee status			
Non-refugee immigrant	Reference group		
Refugee immigrant	0.787	0.728	[0.253-2.447]
Beliefs about Medicines Questionnaire (BMQ)	0.906	**0.019**	[0.901-1.02]

Enabling Factors. The only significant variable among enabling factors associated with optimal medication adherence was perceived discrimination ($P < 0.097$). Participants who perceived high level of discrimination experiences were less likely to

adhere to their medication (OR = 0.459, 90% CI = 0.212–0.992, $P < 0.097$). Other enabling factors such as income, health insurance, and health literacy were not found to be statistically significant predictors of optimal medication adherence (see Table 4.15).

Table 4.15
Binary Logistic Regression of Medication Adherence and Enabling Factors

Independent Variables	OR	P-value	90% Cl
Income		0.836	
$0- $$39,999	Reference group		
$40,000 - $79,999	0.755	0.577	[0.329-1.730]
$80,000 or more	0.942	0.919	[0.356-2.492]
Health insurance			
No	Reference group		
Yes	0.768	0.716	[0.233-2.535]
Health literacy			
The Newest Vital Sign (NVS)			
Limited /Possibility health literacy	Reference group		
Adequate health literacy	1.480	0.407	[0.680-3.217]
Chew's Set of Brief Screening Questions (SBSQ)			
Limited /Possibility health literacy	Reference group		
Adequate health literacy	1.771	0.242	[0.793-3.957]
Perceived discrimination			
Everyday Discrimination Scale (EDS)			
Low	Reference group		
Medium/ High	0.459	**0.097**	[0.212-.992]

Need Factors. As shown in Table 4.16, only health-related quality of life was statistically significant and positively associated with optimal medication adherence. Participants tended to be optimally adherent to medication, as they felt they had been physically healthy. Neither of the two enabling variables (self-reported health conditions and mental health-related quality of life) was a statistically significant predictor of optimal medication adherence.

Table 4.16
Binary Logistic Regression of Medication Adherence and Need Factors

Independent variable	OR	P-value	90% Cl
Self-reported health conditions			
No Conditions	Reference group		
One and more conditions	0.848	0.702	[0.418-1.722]
Health- related quality of life			
Physical SF-12	1.072	**0.05**	[1.011-1.136]
Mental SF-12	1.029	0.356	[0.978-1.082]

Hypothesis 2. Based on ABM, the following sets of predictors would be significantly associated with prediction of HSU and medication adherence: (Model 1) predisposing factors, (Model 2) predisposing and enabling factors, and (Model 3) predisposing, enabling, and need factors. A hierarchical logistic regression analysis was used to test the second hypothesis (see Table 4.17).

Mathematically, and for the purposes of data analysis, the overall research question follows the general model:

$$\text{Logit}(p) = \beta 0 + \beta i \text{ Predisposing} + \beta j \text{ Enabling} + \beta k \text{ Need} + \theta$$

Hierarchical logistic regression analysis was employed to test the predictability of the predictor variables within a group structure (predisposing, enabling, and need factors) and the outcome variables (HSU and medication adherence). Based on the HSU literature, ABM suggests that predisposing, enabling, and need factors have a linear order (Andersen, 1995). First, predisposing variables were entered into the first model (Model 1), because they are typically immutable and incline an individual to have HSU and an optimal level of medication adherence. Second, enabling variables were added to predisposing variables (Model 2), because these provide an estimate of a person's means of and support for HSU and medication adherence. Third, need variables were added to

predisposing and enabling variables (Model 3), having been found to be significant predictors of the HSU and medication adherence. Each variable in the hierarchical analysis was included not only as a means of assessing its distinctive impact on HSU and medication adherence outcomes but also as a potential confounding variable whose inclusion in the analysis was crucial in reducing the potential bias of other variables.

Table 4.17
Hierarchical Logistic Regression Model

Predictor Variables	Hierarchical logistic regression equation	Description *
Predisposing (Age, gender, education, employment status, relationship status, country of origin, length of stay, place of birth, parent place of birth, religion status, religious beliefs, refugee status, beliefs about medicines)	$Y = \beta_0 + \beta_i * Predisposing$	i=1…13
Enabling (Income, health insurance, health literacy, perceived discrimination)	$Y = \beta_0 + \beta_i * Predisposing + \beta_j * Enabling$	i=1…13; j=1…4
Need (Self-reported health conditions, health- related quality of life)	$Y = \beta_0 + \beta_i * Predisposing + \beta_j * Enabling + \beta_k * Need$	i=1…13; j=1…4; k=1, 2

Outpatient Visits

Predisposing Factors. As shown in Table 4.18, when predisposing variables were entered collectively in Model 1, only length of stay ($P < 0.041$) and parent place of birth ($P < 0.049$) were statistically significantly associated with having outpatient visits.

Participants who reported a higher level of education, a longer residence in the United States, and either parent born in the United States (third generation) were less likely to have outpatient visits. The rest of the variables were not found to be statistically significant predictors of having outpatient visits. Overall, Model 1 was not statistically significant ($p < 0.273$) and explained approximately 10.0% of the variance in outpatient visits utilization (Nagelkerke $R^2 = 0.10$). However, Model 1 displayed a slight improvement in correctly classifying the outcome for 72.4% of cases compared with 68.6% in the null model.

Predisposing and Enabling Factors. After controlling the predisposing variables, the enabling set of variables were entered in Model 2 (see Table 4.18). For predisposing variables, unlike in Mode l, none of the predisposing variables were found to be statistically significant with having outpatient visits. Among enabling variables, higher income of $80,000 or more, was found to be statistically significant and associated with having outpatient visits (OR = 3.29, 90% CI = 1.271–8.547, $P < 0.04$). Likewise, health insurance (OR = 3.55, 90% CI = 1.846–6.827, $P < 0.001$) was found to be statistically significant and positively associated with outpatient visits. Additionally, the level of health literacy based on the NVS scale (OR = 2.26, 90% CI = 1.189–4.310, $P < 0.037$) was found to be statistically significant and was positively associated with outpatient visits. Participants who reported an adequate health literacy level were more likely to have outpatient visits. The remaining enabling variables were not found to be statistically significant predictors of outpatient visits. Model 2 was statistically significant ($p < 0.001$) and explained approximately 27.0% of the variance in utilization (Nagelkerke

R^2 = 0.264). The current model classified the outpatient visits outcome correctly for 77.1% of cases, compared with 68.6% for the null model.

Predisposing, Enabling, and Need Factors. After controlling for predisposing and enabling sets of variables, the need-based variables were entered in Model 3 (see Table 4.18). As in Model 1, the parent place of birth variable showed a significant association. Members of the third generation (children born in the United States to U.S.-born parents) were less likely to have outpatient visits (OR = 0.156, 90% CI = 0.046–0.526, $P < 0.012$). Among enabling factors, income was found to be statistically significant and was positively associated with outpatient visits ($P < 0.046$). The health insurance variable remained statistically significant in being associated with having more outpatient visits. Participants who had health insurance tended to have 3.8 times more outpatient visits than uninsured participants (OR = 8.478, 90% CI = 1.74–8.69, $P < 0.005$). Additionally, as in Model 2, participants who had an adequate health literacy level were more likely to have outpatient visits. Finally, self-reported health conditions showed noteworthy results within need factors. In short, participants who had illnesses tended to have more outpatient visits. The final model was statistically significant ($p < 0.000$) and explained approximately 42.0% of the variance in utilization (Nagelkerke R^2 = 0.414). Overall, Model 3 correctly classified the outcome of outpatient visits for 79.1% of cases, compared with 68.6% for the null model.

Table 4.18
Hierarchical Logistic Regression Model Between Predisposing, Enabling, Need Factors and Outpatient Visit N=*210*

	Model 1		Model 2		Model 3	
	Predisposing		Predisposing and enabling		Predisposing, enabling, and need	
	OR	P-value	OR	P-value	OR	P-value
Predisposing Factors						
Age (years) (18-29 R.C)		0.945		0.840		0.802
30-49	0.951	0.908	0.975	0.957	0.860	0.758
50 and older	0.811	0.74	0.679	0.590	0.595	0.506
Gender (Female)	1.151	0.671	1.211	0.601	1.457	0.362
Education (High school and less R.C)						
college and more	1.144	0.750	0.744	0.537	0.566	0.273
Employment status (Student/ Unemployed R.C)		0.846		0.916		0.962
Part-Time/ occasional	0.798	0.563	1.189	0.701	1.027	0.956
Regular Full-Time Work	0.905	0.808	1.163	0.745	1.145	0.788
Length of Stay	1.045	**0.041**	1.032	0.211	1.018	0.537
Place of birth (U.S.)	0.990	0.983	0.770	0.615	1.584	0.435
Parent place of birth (U.S.)	0.990	**0.049**	0.389	0.127	0.156	**0.012**
Relationship status. (Married)	1.223	0.597	1.237	0.621	0.968	0.945
Religious beliefs (little religious R.C)		0.665		0.372		0.729
Somewhat religious	1.414	0.435	1.843	0.227	1.202	0.745
Deeply religious	1.493	0.392	2.039	0.182	1.596	0.449
Refugee status (Refugees)	1.413	0.504	1.360	0.591	1.928	0.291
Enabling Factors						
Income ($0- $$39,999 R.C)				0.102		**0.046**
$40,000 - $79,999			1.700	0.186	2.572	**0.042**
$80,000 or more			3.296	**0.040**	4.051	**0.029**
Health insurance (yes)			3.550	**0.001**	3.704	**0.002**

	Model 1		Model 2		Model 3	
	Predisposing		Predisposing and enabling		Predisposing, enabling, and need	
	OR	P-value	OR	P-value	OR	P-value
Health literacy						
The Newest Vital Sign. Adequate health literacy			2.264	**0.037**	2.576	**0.030**
Chew's Set of Brief Screening Questions. Adequate health literacy			0.718	0.440	0.877	0.781
Perceived discrimination						
Everyday Discrimination Scale Medium/ High			0.914	0.811	0.837	0.686
Need Factors						
Self-reported health conditions (One and more conditions)					8.478	**0.000**
Health- related quality of life						
Physical SF-12					0.955	0.185
Mental SF-12					1.020	0.516

Preventive Care Utilization

Predisposing Factors. As shown in Table 4.19, Model 1 showed only the results of the predisposing factors. First, the age variable was found to be statistically significant and was positively associated with preventive care utilization ($P < 0.019$). The older participants were more likely to utilize preventive care. Second, females were four times more likely to utilize preventive care than males were (OR = 3.98, 90% CI = 2.121–19.015, $P < 0.001$). Finally, the length of stay variable was found to be statistically significant and was positively associated with preventive care utilization (OR = 1.056, 90% CI = 1.01–1.09, $P < 0.031$). The rest of the variables were not found to be statistically significant predictors of preventive care utilization. Model 1 was significant ($p < 0.000$) and explained approximately 31.0% of the variance in utilization (Nagelkerke

R^2 = 0.307). The current model classified the preventive care utilization outcome correctly for 76.7% of cases, compared with 68.6% for the null model.

Predisposing and Enabling Factors. After controlling for the predisposing variables, the enabling set of variables were added in Model 2 (see Table 4.19). From the predisposing variables, age ($P < 0.031$) and gender (female; $P < 0.001$) continued to be statistically significant as well as positively associated with preventive care utilization. The remaining predisposing variables were not found to be statistically significant predictors of this outcome. For enabling variables, health insurance was found to be statistically significantly associated with preventive care utilization (OR = 2.57, 90% CI = 1.08–6.115, $P < 0.073$). The remaining enabling variables were not statistically significant predictors of preventive care utilization. Model 2 was significant ($p < 0.000$) and explained approximately 37.0% of the variance in utilization (Nagelkerke R^2 = 0.374). This model correctly classified the outcome of preventive care utilization for 78.1% of cases, compared with 68.6% for the null model.

Predisposing, Enabling, and Need Factors. After controlling for predisposing and enabling sets of variables, need variables were entered in Model 3 (see Table 4.19). For Models 1 and 2, both age ($P < 0.033$) and gender (female; $P < 0.01$) from among the predisposing variables remained statistically significant for preventive care utilization. Women and older participants were more likely to utilize preventive care than men and younger participants. For enabling factors, much as for Model 2, only health insurance was found to be statistically significantly associated with preventive care utilization (OR = 2.516, 90% CI = 1.041–6.084, $P < 0.086$). The remaining predisposing, enabling, and need variables were found to be statistically nonsignificant predictors of preventive care

utilization. The final model was significant ($p < 0.000$) and explained approximately 39.0% of the variance in preventive care utilization (Nagelkerke $R^2 = 0.385$). Overall, this model correctly classified outcome of preventive care utilization for 79.0% of cases, compared with 68.6% for the null model.

Table 4.19
Hierarchical Logistic Regression Model Between Predisposing, Enabling, Need Factors and Preventive Care Utilization N=*210*

	Model 1		Model 2		Model 3	
	Predisposing		Predisposing and enabling		Predisposing, enabling, and need	
	OR	P-value	OR	P-value	OR	P-value
Predisposing Factors						
Age (years) (18-29 R.C)		**0.019**		**0.031**		**0.033**
30-49	1.819	0.204	1.842	0.212	1.789	0.244
50 and older	6.351	**0.006**	6.90	**0.009**	6.893	**0.010**
Gender (Female)	3.988	**0.001**	4.231	**0.001**	4.833	**0.001**
Education (High school and less R.C)						
college and more	0.870	0.776	0.536	0.245	0.487	0.188
Employment status (Student/ Unemployed R.C)		0.580		0.779		0.768
Part-Time/ occasional	0.665	0.364	0.862	0.762	0.894	0.820
Regular Full-Time Work	0.658	0.374	0.699	0.480	0.691	0.471
Length of Stay	1.056	**0.018**	1.041	0.101	1.033	0.201
Place of birth (U.S.)	0.723	0.535	0.574	0.330	0.676	0.503
Parent place of birth (U.S.)	1.955	**0.288**	2.392	0.195	1.960	0.339
Relationship status (Married)	1.356	0.482	1.562	0.322	1.616	0.299
Religious beliefs (little religious R.C)		0.985		0.940		0.943
Somewhat religious	0.914	0.868	1.031	0.958	0.914	0.879
Deeply religious	0.953	0.933	1.184	0.781	1.070	0.915
Refugee status (Refugees)	0.947	0.917	1.001	0.998	1.050	0.931

	Model 1		Model 2		Model 3	
	Predisposing		Predisposing and enabling		Predisposing, enabling, and need	
	OR	P-value	OR	P-value	OR	P-value
Enabling Factors						
Income. ($0- $$39,999 R.C)				0.296		0.261
$40,000 - $79,999			1.187	0.717	1.277	0.614
$80,000 or more			2.308	0.145	2.522	0.117
Health insurance (yes)			2.570	**0.073**	**2.516**	**0.086**
Health literacy						
The Newest Vital Sign. Adequate health literacy			1.860	0.170	1.829	0.186
Chew's Set of Brief Screening Questions Adequate health literacy			1.080	0.878	1.126	0.817
Perceived discrimination						
Everyday Discrimination Scale Medium/ High			0.837	0.653	0.863	0.727
Need Factors						
Self-reported health conditions (One and more conditions)					1.812	0.146
Health- related quality of life						
Physical SF-12					1.005	0.882
Mental SF-12					1.019	0.541

Medication Adherence

Predisposing Factors. As shown in Table 4.20, Model 1 showed the results of predisposing factors only. The age variable was found to be statistically significant and was positively associated with optimal medication adherence ($P < 0.062$). The age of participants increased the likelihood of optimal medication adherence. Moreover, participants who were born in the United States were more likely to have optimal medication adherence. The rest of the variables were not found to be statistically

significant predictors of optimal medication adherence. Model 1was significant ($p < 0.02$) and explained approximately 31.0% of the variance in medication adherence (Nagelkerke $R^2 = 0.307$). The current model, however, classified the medication adherence outcome correctly for 74.0% of cases, compared with 74.8% for the null model.

Predisposing and Enabling Factors. After controlling for the predisposing variables, the enabling set of variables were added in Model 2 (see Table 4.20). As in Model 1, age was a significant predictor of optimal medication adherence. Additionally, beliefs about medicines was statistically significant and was negatively associated with optimal medication adherence. Participants were more likely to have optimal medication adherence as the negative perception of medication diminished. However, the remaining predisposing and enabling variables were found to be statistically nonsignificant predictors of optimal medication adherence. Model 2 was significant ($p < 0.048$) and explained approximately 36.0% of the variance in utilization (Nagelkerke $R^2 = 0.359$). The current model classified the medication adherence outcome for 74.1% of cases, compared with 74.8% for the null model.

Predisposing, Enabling, and Need Factors. After controlling for predisposing and enabling sets of variables, need variables were entered in Model 3 (see Table 4.20). As for Models 1 and 2, older participants were more likely to have optimal medication adherence. Likewise, the beliefs about medicines variable was a significant predictor of optimal medication adherence ($P < 0.006$). Among enabling variables, uninsured participants were more likely to have optimal medication adherence ($P < 0.073$). For the need variables, health-related quality of life was statistically significantly associated with optimal medication adherence. The physical component was positively associated with

optimal medication adherence (OR = 1.238 90% CI = 1.103–0.872, $P < 1.389$). As the quality of life improved, participants were more likely to have optimal medication adherence. The remaining predisposing, enabling, and need variables were found to be statistically nonsignificant predictors of optimal medication adherence. The final model was significant ($p < 0.003$) and explained approximately 37.0% of the variance in medication adherence (Nagelkerke $R^2 = 0.365$). Overall, this model correctly classified outcome of medication adherence for 83.5% of cases, compared with 74.8% for the null model.

Table 4.20
Hierarchical Logistic Regression Model Between Predisposing, Enabling, Need Factors and Medication Adherence N=*115*

	Model 1		Model 2		Model 3	
	Predisposing		Predisposing and enabling		Predisposing, enabling, and need	
	OR	P-value	OR	P-value	OR	P-value
Predisposing Factors						
Age (years) (18-29 R.C)		**0.062**		**0.051**		**0.018**
30-49	9.314	**0.026**	10.986	**0.023**	28.837	**0.007**
50 and older	16.153	**0.025**	26.69	**0.020**	151.33	**0.006**
Gender (*Female*)	1.55	0.481	1.273	0.714	0.534	0.432
Education. (High school and less R.C)						
college and more	0.721	0.710	0.693	0.709	0.971	0.979
Employment status. (Student/ Unemployed R.C)		0.475		0.405		0.118
Part-Time/ occasional	1.822	0.366	1.712	0.460	1.062	0.943
Regular Full-Time Work	0.883	0.866	0.642	0.594	0.167	0.102
Length of Stay	1.024	0.453	1.024	0.174	1.057	0.186
Place of birth (U.S.)	4.60	**0.090**	3.541	0.686	4.288	0.172
Parent place of birth (U.S.)	0.708	0.732	0.628	0.680	0.615	0.712

	Model 1		Model 2		Model 3	
	Predisposing		Predisposing and enabling		Predisposing, enabling, and need	
	OR	P-value	OR	P-value	OR	P-value
Relationship status. (Married)	0.731	0.673	0.722	0.970	0.531	0.512
Religious beliefs. (little religious R.C)		0.956		0.895		0.630
Somewhat religious	1.021	0.986	0.857	0.998	1.38	0.810
Deeply religious	1.202	0.867	0.998	0.623	2.769	0.468
Refugee status (Refugees)	1.536	0.625	1.587	0.998	1.950	0.540
Beliefs about Medicines Questionnaire	0.871	0.583	0.868	0.022	0.812	**0.006**
Enabling Factors						
Income. ($0- $$39,999 R.C)				0.791		0.302
$40,000 - $79,999			0.628	0.498	0.311	0.150
$80,000 or more			0.707	0.676	0.312	0.220
Health insurance (yes)			0.303	0.284	0.096	**0.073**
Health literacy						
The Newest Vital Sign. Adequate health literacy			1.729	0.414	2.502	0.255
Chew's Set of Brief Screening Questions Adequate health literacy			2.833	0.196	2.227	0.364
Perceived discrimination						
Everyday Discrimination Scale Medium/ High			0.617	0.451	0.438	0.279
Need Factors						
Self-reported health conditions (One and more conditions)					1.903	0.368
Health- related quality of life						
Physical SF-12					1.238	**0.002**
Mental SF-12					0.936	0.223

Summary

From the qualitative analysis, six major themes emerged that shed light on factors that influence HSU and medication adherence of ADAs in South Florida:
(1) characteristics of Arab culture, (2) access and insurance, (3) health literacy,
(4) perceived discrimination, (5) reactions toward physical health, and (6) mental health stigma.

The results of the quantitative phase indicated that 68.6% made outpatient visits and 31.4% utilized preventive care. For the medication adherence outcome, only 25.2% of medication adherence was optimal. The binary logistic regression results highlighted significant predictors of outpatient visits, including length of stay, parent place of birth, income, health insurance, adequate health literacy, and self-reported health conditions. All these predictors, except the length of stay variable, were also significant in the final model of the hierarchical logistic regression.

For preventive care utilization, binary logistic regression identified age, gender, length of stay, being in a relationship or being married, income, health insurance, and health conditions as significant predictors. However, only age, gender, and health insurance variables remained significantly associated with prediction of preventive care utilization for the final model of the hierarchical logistic regression.

For medication adherence results, binary logistic regression presented age, employment status, length of stay, beliefs about medicines, perceived discrimination, and physical quality of life as significant predictors of optimal medication adherence. However, only age, beliefs about medicines, health insurance, and physical quality of life

continued to be significant predictors of having optimal medication adherence for the final model of the hierarchical logistic regression.

Chapter 5 discusses qualitative and quantitative results. Practical implications of findings and recommendations for future research are also provided.

Chapter 5

Discussion

A sequential mixed-method exploratory design described by Creswell and colleagues (2003) and Tashakkori and Teddlie (1998) was previously conducted to analyze, compare, and integrate data generated by ethnographic focus groups and a survey questionnaire, with a view to answering mixed-method research questions. This mixed-method approach expands knowledge about the health status of ADAs and contributes robust research to the limited body of literature on this group's health. Additionally, it explores the impact of health literacy level and perceived discrimination on HSU and medication adherence among ADAs in South Florida.

This chapter discusses the results of this dissertation and interprets them in the context of the limited literature on this minority population. It is divided into three sections presenting qualitative, quantitative, and mixed-method discussion of the findings, respectively. The first section discusses the qualitative findings, and the second section discusses the quantitative findings. The third and last section interprets the mixed-method findings, with results from both phases of the study integrated and further contrasted with findings from previous studies on ADAs. Finally, the significance, strengths, and limitations of this dissertation are addressed, and their implications and recommendations for future research are presented.

Phase I Qualitative Discussion

Qualitative findings provided detailed descriptions of the factors impacting ADAs' health status. Our findings revealed six significant themes that emerged within minor subcategory themes, which clarify the factors that could affect HSU and medication adherence among ADAs in South Florida: (1) characteristics of Arab culture, (2) access and insurance, (3) health literacy, (4) perceived discrimination, (5) reactive attitude toward physical health, and (6) mental health stigma. Discussion of the results revealed correlations among these themes that could complicate HSU and medication adherence.

Among predisposing factors, characteristics of Arab culture, the role of family, religion, and differences among groups, such as between genders and among generations, were major themes of discussion. Participants emphasized that Arab culture is not homogeneous and that this heterogeneity has implications for HSU and medication adherence. ADAs' diverse countries of origin, geographic locations, tenures in the United States, and levels of acculturation made understanding health indicators challenging, as differences in health outcomes among them could be disparate. These findings paralleled those of other studies that have examined ADAs. Related to this study's findings, Amer (2014) indicated that generational status and length of residence in the United States were significant considerations in describing ADAs' acculturation and its implications for health outcomes. Abdulrahim and Ajrouch (2010) reported that self-rated health improved with acculturation to U.S. society. Al-Dahir et al. (2013) found that higher levels of acculturation were associated with lower diabetes risk. By contrast, a study

conducted by Dallo and James (2000) showed that blood pressure was not associated with acculturation.

Findings related to the importance of the family in ADAs' health context were similar to those of other research on ADAs (Aloud & Rathur, 2009; Awad, 2010; Haboush, 2007). Aboul-Enein et al. (2010), in a study of the cultural gap in delivering healthcare services to ADAs, advised that health professionals include a family spokesperson rather than communicating exclusively with a patient.

Another major theme was the role of religion in shaping ADAs' health and health outcomes. Religion is an integral component of Arab culture. This finding was comparable to those of other research (Ahmed et al., 2014; Awad, 2010; Balesh et al., 2018). ADAs who were more connected to their religion exhibited higher levels of well-being and healthy lifestyles (Strawbridge et al., 2001). Amer and Hovey (2007) found that among Muslim ADAs, depression was associated with less religiosity. Additionally, some researchers have suggested that religiosity explains the low suicide rate among ADAs and discourages risky behaviors such as consuming alcohol and drugs (Abu-Ras et al., 2010; Ahmed et al., 2014; El-Sayed et al., 2011).

Our findings supported those of other studies regarding the association between religious affiliation and perceived discrimination, as a result of which well-being may be adversely impacted. Awad (2010) found that Muslim ADAs who were more acculturated experienced more discrimination than their less acculturated counterparts. In another study, Muslim Arabs residing in Canada reported more perceived discrimination than non-Muslim Arabs. Discrimination was significantly correlated with Muslim Arab psychological distress but not with non-Muslim Arab participants (Rousseau et al., 2011).

Similarly, one study showed that hate crimes and discrimination directed toward Muslims due to their religious affiliation increased their depression and their incidence of posttraumatic stress disorder (PTSD; Abu-Ras & Abu-Bader, 2009).

Findings from the focus group indicated that limited health literacy, including language barriers and concordance and discordance between patient and physician, might endanger ADAs' HSU and medication adherence. Through the discussion, an association emerged between the themes of health literacy and the study outcomes. Such findings resemble those of studies among other Arabs. Kayrouz et al. (2015) found that significant barriers to mental HSU reported by Arab Australian respondents with high psychological distress were poor mental health literacy, lack of time, and stigma. A study conducted in Australia among Arab refugees found that limited health literacy was a significant factor influencing help-seeking behavior among individuals who had mental health problems (Yaser et al., 2016).

Phase II Quantitative Discussion

The average age of participants was 34 years, and the majority held a bachelor's degree or higher—results consistent with those of previous studies finding that ADAs were more educated than the average American, with 49.0% of ADAs having a bachelor's degree or higher, compared with 32.0% of Americans at large. Roughly 20.0% of ADAs have a postgraduate degree, nearly twice the U.S. average of 12.0% (Asi & Beaulieu, 2013). Findings regarding income were comparable to other studies, with almost half the sample's income ranging from $40,000 to $79,999. The median income for ADA households in 2018 was $60,398, close to all households' national median income of $63,688. ADAs' socioeconomic profile was more favorable than some other

ethnic groups', with the median income in 2018 for Black households being $41,361 and that for Hispanic households being $51,450 (U.S. Census Bureau, 2019).

The majority of the sample comprised full-time working, married Muslims who were not refugees. Similar findings regarding immigration, marital status, and religion have been reported in previous studies (Abuelezam et al., 2019; Elsouhag et al., 2015; Sarsour et al., 2010; Tailakh et al., 2016). ADAs showed a favorable level of health literacy compared with Hispanic or Latino groups (Dunn-Navarra et al., 2012; Yin et al., 2011). Level of perceived discrimination reported among ADAs was comparable with that reported in previous studies, with half of participants experiencing a high level of perceived discrimination (Assari & Lankarani, 2017; Kader et al., 2020). However, different measuring scales were utilized to capture the level of perceived discrimination. Finally, health-related quality of life summary scores were standardized to the average U.S. population. Although the PCS score in this study was analogous to the general U.S. population, a lower score was shown on the MCS, suggesting limitations on the ability to conduct daily tasks and work. These limitations occurred due to decreased physical or emotional functioning, interference with regular social activities, feelings of nervousness and depression, extreme and debilitating body pain, poor perception of personal well-being, and constant tiredness (Holt et al., 2010).

Healthcare Services Utilization (HSU)

Outpatient Visits. Results indicated that 68.6 % of ADAs had made outpatient visits in the last year. This finding was similar to that of a prior study focusing on factors associated with HSU among ADAs immigrants and refugees, which found that 58.6% utilized medical healthcare services (Elsouhag et al., 2015).

The results of the hierarchical logistic regression showed that by adding the predictor variables sets of each ABM component (predisposing, enabling, and need factors) in a stepwise regression, the accuracy of the model improved, explaining more of the variance in the outcome. After controlling for predisposing, enabling, and need factors, ADAs who had U.S. parents, high income, health insurance, adequate health literacy, and several health conditions were associated with increased odds of having outpatient visits. In the literature, a related study was conducted by Elsouhag et al. (2015). Researchers studied the factors associated with healthcare utilization among Arab immigrants and refugees. Much as with the current study's findings, Elsouhag et al. (2015) found that having health insurance was a significant predictor of the utilization of medical services. In contrast with this study's findings, however, they also found that existing health conditions were not significant predictors of medical services utilization.

This study's finding that multiple health conditions increased the odds of having outpatient visits was not surprising. In addition, as the ABM implied, high income and health insurance were noteworthy factors associated with increased odds of having outpatient visits. Research has shown that access to health care and HSU are tied to the availability of economic resources and the affordability of health insurance (Andersen, 1995; Henry & Henry J. Kaiser Family Foundation, 2016). Moreover, the lack of health insurance has been identified as an important driver of healthcare disparities (National Academies of Sciences et al., 2018; Nelson, 2002).

Previous studies, however, have suggested that the higher the degree of assimilation or acculturation, the higher the likelihood of HSU (Kao, 2009; Yang & Hwang, 2016). Place of parent birth partially determined levels of acculturation

assimilation in the United States, in contrast with this study's finding that ADAs who had U.S. parents were less likely to have outpatient visits. Some reasons for this were related to the degree to which ADA individuals adapted to U.S. culture, because acculturated ADAs are more likely to adopt healthy lifestyle behaviors. The degree of adaptation partly accounts for variations in HSU (Yang & Hwang, 2016).

An adequate level of health literacy was significantly associated with having outpatient visits, so that limited health literacy could be a barrier to HSU. This finding was consistent with those of previous studies conducted among ADAs, in which limited health literacy level affected HSU (Abboud et al., 2017; Arshad et al., 2011; Jacoby et al., 2015; Talaat, 2015; Talley & Williams, 2015; Williams et al., 2014). Similarly, Elsouhag et al. (2015) indicated that language barrier could be an influential factor interfering with level of health literacy (Elsouhag et al., 2015). Accordingly, inadequate health literacy and knowledge can impact an individual's decision to seek HSU. Another factor that could contribute to this association is the level of individual literacy in navigating the U.S. healthcare system, particularly because the ADA community includes a mix of immigrants and refugees.

Preventive Care Utilization. The majority of the study sample reported underutilization of preventive care services, a result congruent with previous studies finding that Arabs usually do not use preventive screening, seeking medical care only for serious and acute health problems (Aboul-Enein & Aboul-Enein, 2010). Furthermore, a review by Abboud et al. (2017) found that the screening rate of cervical cancer in ADA women varied considerably among studies, ranging between 50.0% and 87.0%—noticeably below the Healthy People 2020 goal of 93.0%. Similarly, Dallo and Kindratt

(2015) found that foreign-born ADA women were less likely to receive a breast exam than U.S.-born White women. Talat et al. (2015) also found that ADAs underutilize preventive care services, with ADAs in Michigan having lower colorectal cancer screening rates than the general population (45.6% vs. 60.8%).

After controlling for predisposing, enabling, and need factors on the hierarchical logistic regression final model, only age, gender, and health insurance remained associated with preventive care utilization. As suggested in previous studies, women were more likely to utilize preventive care (National Academies of Sciences et al., 2018; Salganicoff et al., 2014; Talaat & Harb, 2013; Yang & Hwang, 2016). These results can be explained by the types of items included in the current study survey: The items on the preventive HSU questionnaire were tailored for women's preventive care utilization (e.g., breast mammography and Pap smear). Relatedly, age was a significant predictor of preventive care utilization. In this study, the older participants were, the more they tended to report preventive care utilization. These results were consistent with other studies in which older ADA women were more likely to have breast examinations (Petro-Nustas et al., 2012). As already mentioned, having health insurance is considered a risk factor for having preventive care utilization. Comparable studies found that out-of-pocket costs for healthcare and a lack of health insurance were associated with less frequent Pap smears (Abboud et al., 2017).

Although these dissertation findings indicated that only age, gender, and health insurance were significant factors in the final model, the other factors were noteworthy influences on preventive care utilization. Research has shown that length of stay in the United States, being in a relationship, being married, having adequate health literacy, and

country of origin impact the likelihood of preventive screening (Abboud et al., 2017; Abdelfattah et al., 2015; Alatrash, 2019; Dallo & Kindratt, 2015a, 2015b; Salman, 2012; Schwartz et al., 2008; Talaat, 2015; Talley & Williams, 2015; Williams & Templin, 2013).

Medication Adherence

The findings of this study revealed optimal medication adherence (25.2%) consistent with that seen in a previous study that examined medication adherence using MMAS-8, which reported a similar optimal medication adherence rate (29.2%) among ADAs in California (Tailakh et al., 2016). A comparable study among Middle Eastern Arabic-speaking migrants and refugees in Australia found that 10.7% of 392 Arabic-speaking participants reported an optimal medication adherence level, compared with 51.9 % of 309 English-speaking Caucasian Australian participants (Alzubaidi et al., 2015).

The present study findings regarding age were, however, analogous to those of previous studies, in which increasing in medication adherence level was found to be associated with increased age (Bandi et al., 2017; Cohen et al., 2012; Sayegh et al., 2016; Surbhi, 2016). This finding suggests that older people may have more interactions with healthcare providers and communication with pharmacists as a result of having appointments, leading to a stronger belief in the importance of medication management and a higher level of experience with managing medications (Cohen et al., 2012; Gazmararian et al., 2010).

Being employed was found to have a positive influence on medication adherence rate, although several studies showed uncertain evidence for the impact of employment

status on medication adherence (Gast & Mathes, 2019). Some evidence of a positive effect was reported in patients infected with HIV (Gemeda et al., 2012; Nachega et al., 2015). Other studies that investigated this influencing factor with different conditions (hepatitis C, inflammatory arthritis, and cardiovascular conditions) showed mixed, inconsistent results (Mathes et al., 2014; Pasma et al., 2013). In addition, a review of studies that addressed medication adherence among patients with diabetes in the MENA region revealed that Ashur et al. (2015) and El-Khawaga et al. (2015) found a significant positive association of employment status with medication adherence, whereas Alatawi et al. (2016) found a negative association (Jaam et al., 2017).

The results of this study revealed a positive association between length of stay in the United States and medication adherence. Typically, length of the residency in the United States refers to level of acculturation and assimilation. As expected, a more extended residency is indicative of a higher degree of assimilation to U.S. culture. In contrast with this study's findings, Tailakh et al. (2014) found a nonsignificant influence of acculturation on medication adherence among ADAs in California. However, besides the dissimilarity among the states of residence, there were differences in measurement tools used between studies to capture the impact of acculturation on medication adherence.

Patients' concerns and beliefs about medicines were expected to have a negative association with optimal medication adherence. The results from this study support the hypothesis that as beliefs in harm and overuse associated with medication increase, optimal medication adherence rate decreases. These findings were comparable to those of Alzubaidi et al. (2015), who found that beliefs about medications influenced the rate of

adherence to diabetes self-care among Arabic-speaking migrants in Australia. The findings of other studies among different ethnicities (e.g., American Korean, African American) and disease conditions were consistent with this study's results (Brandstetter et al., 2017; McQuaid & Landier, 2018; Park et al., 2018; Unni, 2008).

Among enabling factors, health insurance was found to influence medication adherence. As hypothesized, having health insurance is considered a significant predictor of medication adherence. However, having health insurance was a significant predictor of a suboptimal medication adherence level, contrary to the findings of Gast and Mathes (2019) within diverse populations, in which the influence of health insurance status (insured vs. uninsured) on medication adherence was uncertain. The review presented some studies that showed a positive influence of having health insurance on medication adherence, whereas others showed no significant relationship. The findings in the current study can be explained by the fact that uninsured participants were paying out of pocket for needed medications, which prompted them to be highly adherent to their medications (Ahrari et al., 2014; Koprulu et al., 2014; Maimaris et al., 2013).

Perceived discrimination had an undesirable impact on medication adherence. The results of this study were aligned with previous research findings that perceived discrimination, typically assessed by self-report, was related to suboptimal medication adherence among minority groups (Boarts et al., 2008; Haywood et al., 2014; Kronish et al., 2013). A study conducted among African Americans who had hypertension revealed that perceived discrimination was associated with poor medication adherence, a relationship related to increased stress and depression (Forsyth et al., 2014).

The results obtained regarding need factors and how ADAs view their general health and functional state indicated that as physical quality of life improved, patients became optimally adherent. Previous studies assessing the relationship between health-related quality of life and medication adherence have produced conflicting results. In a sample of geriatric patients, a positive association was detected between health-related quality of life and self-reported antihypertensive medication adherence; participants with high PCS and MCS scores were more likely to have optimal antihypertensive medication adherence (Holt et al., 2010). Numerous studies indicated a non-statistically significant relationship between health-related quality of life and self-reported medication adherence (Hanus et al., 2015; Mochizuki et al., 2013). A study of patients who had COPD found that improved health-related quality of life was a trigger for suboptimal adherence (Ágh et al., 2011). Such variability might be caused by several factors, such as differences in study design, study population, therapy, medication adherence measurement methods, and health-related quality of life instruments.

Mixed-Methods Discussion

To investigate the questions of interest, a sequential mixed-method exploratory design was applied. The mixed-method sequential exploratory design consisted of analyzing, comparing, and integrating data generated by the ethnographic focus groups as well as a survey questionnaire, with a view to answering the mixed methods research question (Creswell & Creswell, 2017; Teddlie & Tashakkori, 2003). The goal in examining the interplay of these two elements of the study was to further explore the impact of health literacy level and level of perceived discrimination and their effect on

HSU and medication adherence among ADAs in South Florida while also expanding knowledge of health status among this population.

Mixed-Methods Research Question

How does a mixed-method approach, as employed here, expand knowledge about HSU and medication adherence in this population? Furthermore, how does this synergistic approach broaden understandings of the various aspects underlying the health outcomes of this group?

The reasoning behind combining both types of methods (first qualitative and then quantitative) was based on the theoretical assumption that qualitative findings would provide critical insights into factors influencing participants' HSU and medication adherence. Qualitative findings via focus group strengthened the questionnaire in the quantitative phase. As anticipated, the interplay of qualitative and quantitative data brought synergy to conclusions from each phase and contributed a pivotal and holistic approach to the overall understanding of results. As shown hereafter, data based on the conceptual model of ABM and generated by the ethnographic focus groups and quantitative survey were combined to include patterns of HSU and medication adherence.

The resulting themes guided the quantitative study development to allow further exploration of these dissertation concerns. For instance, the measure of religiosity beliefs was added to the study survey based on the qualitative finding that religiosity could influence the study outcomes. One participant said, "You have to practice your religion and be proactive towered your health," and another emphasized that being healthy has an association with religiosity beliefs: "In our religion does prescribe for being proactive when it comes to your health." However, the level of religiosity beliefs was not found to

be statistically significant in quantitative analysis supporting the influence of this aspect on the study outcomes. One reason for this could be that most of the participants were Muslims and came from similar communities in which religiosity varied little.

The age of ADAs had a considerable influence on the study outcomes. Older participants were more likely to have higher preventive care utilization and optimal medication adherence. Parent place of birth was a noteworthy factor associated with HSU: ADAs who had U.S. parents were less likely to make outpatient visits. Such findings support the influence of HSU on generational differences among ADAs. Findings of qualitative data provided a detailed description of generational differences among ADAs, supporting the association yielded by the quantitative analysis.

Access to care by having health insurance was a pivotal impact factor on the pattern of HSU and medication adherence. Ethnographic focus group dissection revealed important additional information that helped further explain these results. Participant 07 said, “There are different health insurance and different aids from the government like Medicaid. A lot of people are not able to get the right insurance so they can’t see the doctor, do annual check-ups, or be proactive with their health.” This view was clearly seen in one statement in particular: “The reason why my husband did not go to the doctor because he did not have insurance.”

Finally, evidence from the ethnographic focus groups revealed that ADAs had their own beliefs concerning medications and treatments, potentially influencing their medication adherence. ADAs tended to seek an alternative perceived safe medication, such as an herbal remedy, and tended to rely on self-medication. This was strengthened by their narratives: “If you go to my house, I just have Aleve now because my son gets

some headaches . . . . I don't have to take all the pain medications that the doctor gives me . . . I don't know the effects long-term." Participants also emphasized their beliefs toward medications: "Just because I go to the doctor, that doesn't necessarily mean that I will take all the medication that they prescribed." One factor that could further impact the level of medication adherence was the type of medication used, such as mental health-related medications: "Because it is an antidepressant, it's hard to accept taking them." Comparably, the findings yielded by quantitative analysis supported the significance of beliefs about medicines: As ADAs' negative perception of medication and worries increased, participants became more likely to have suboptimal medication adherence.

Significance and Implications

This dissertation posited the exploratory nature of research among ADAs and represented a fundamental step toward better understanding the risk factors that influence their health outcomes. The results of this dissertation have provided an overview of the risk factors associated with the pattern of HSU and medication adherence outcomes among ADAs in South Florida as well as the impact of health literacy level and perceived discrimination on study outcomes. This dissertation has contributed robust research to the limited body of literature on this group's health and to health outcome research based on contemporaneous Arab culture in the United States. Although published literature does offer insights, these can reflect a specific context or period of history. Because ADAs' culture in the United States is dynamic, depending solely on the published literature can lead to stereotyping and simplistic conclusions that do not apply to the actual sample population (Amer & Awad, 2015). The mixed-method study design employed provided valuable methodological approach and feasible data that proved critical in identifying,

understanding, and explaining the questions explored in this dissertation. This dissertation is based on the ABM and used it as a theoretical framework for advancing research methodology in determining the main factors that impact ADAs' health and health outcomes, such as HSU and medication adherence.

In addition, most ADA studies have been conducted in two cities in Michigan: Dearborn and Detroit. Although Michigan has the highest concentration of Arabs in the United States, this population includes a disproportionate number of Muslims and recently arrived immigrants, who tend to have lower socioeconomic statuses than do ADAs nationwide (Read et al., 2005). A recent comprehensive literature review of ADAs' health found that the majority of studies were still conducted in Michigan (N = 90, 36%), followed by Minnesota (N = 30, 12.0%), California (N = 11, 5.0%), New York (N = 8, 3.0%), and Virginia (N = 4, 2.0%; Abuelezam et al., 2018). Although several studies focused on health outcomes of ADAs nationwide, the current study is novel in having explored medication adherence and HSU among ADAs in South Florida.

This dissertation suggests several implications for healthcare and pharmacy practice, health policy, and future research.

Healthcare and Pharmacy Practice

The findings of this dissertation have substantial implications for healthcare and pharmacy practice. ADAs are a fast-growing ethnic minority in the United States, marked by the impact of migration as multinational and multiethnic populations. Healthcare providers and pharmacists should take into consideration variations among ADAs and the unique and nuanced needs of immigrants. The findings of this study suggest that health literacy influences on HSU outcomes. Offering interpreters can be effective in helping

overcome some barriers related to language and literacy in healthcare practice. Further strategies are needed, however, to improve the level of health literacy and knowledge among ADAs. Providing supplementary instructions to patients in both languages (Arabic and English) through oral and written information could improve health literacy level and health outcomes.

As the pharmacy profession evolves, medication reconciliation and medication counseling are increasingly being conducted by pharmacists. The results of this dissertation have provided information that pharmacists and healthcare providers should consider during patient counseling of ADAs, prompting them to ask about ADAs' use of home remedies and traditional medicines. As pharmacists and healthcare providers learn more about cultural health practices, they must provide a safe space in which ADA patients feel confident talking about use of alternative medicines or prescription drugs, to avoid dangerous contraindications.

In addition, the results of this dissertation regarding beliefs about medicines as a predictor of optimal medication adherence have highlighted the need for belief-based intervention to improve medication adherence. Effective communication is needed between healthcare providers/pharmacists and ADA patients to improve medication adherence. Pharmacists and healthcare providers should encourage ADA patients to express their views about medicines so as to optimize and personalize the information process. Doing so can stimulate concordance of communication and encourage medication adherence. Furthermore, counseling by a pharmacist can help decrease ADA patients' concerns about medication and increase their understanding of the necessity of medication, enhancing their adherence and consequently improving their health.

Another consideration for healthcare providers and pharmacists in healthcare practice is the significance of perceived discrimination among ADA women, particularly those wearing the *hijab*. Healthcare providers and pharmacists should strive to make ADA women feel comfortable and accepted in healthcare settings by promoting cultural competency in healthcare practice—systems' ability to respect diversity in a patient population as well as cultural factors that can affect health and health care, such as language, communication styles, beliefs, attitudes, and behaviors (National Institutes of Health, 2017). Emphasizing the concept of cultural competency in healthcare practice can overcome health disparities and improve access to quality healthcare services for ADAs.

The results of both phases indicated the significant impact of health insurance on HSU. Several reasons could hurdle ADAs for having health insurance, such as the inability to afford the coverage offered by the Affordable Care Act (ACA), disqualification for government insurance (e.g., Medicaid) due to naturalization status, and inadequate knowledge about health insurance reforms. ADAs should be educated about the ACA and expanded insurance options to address those obstacles. Informing them about other health insurance options, such as immigration reform policies, specifically the Deferred Action for Childhood Arrivals policy, could also open access for ADAs who are not eligible for care under the ACA (Velasco-Mondragon et al., 2016). Further scalable, tailored, and culturally and linguistically compatible approaches in health communication are required by healthcare providers and pharmacists to support outreach to ADAs in South Florida.

Health Policy

Several policies have been reinforced by the IOM that promote understanding and elimination of racial and ethnic disparities in healthcare. These polices include goals such as improving data collection and measurement of health data by race, ethnicity, sex, and primary language in healthcare sectors (Gold, 2014). Collecting these data should facilitate mentoring and detecting for disparities in access, HSU, quality, safety, and health outcomes. Recognizing ADAs as a distinct racial category in health data would help inform accurate understandings of ADAs' health. Such data collection is a critical step in moving toward elimination of disparities in healthcare and thereby meeting ADAs' particular medical and public health needs. Additionally, further evaluation of ADAs should facilitate research among large national databases that may ensure that ADAs receive better-quality care and as much attention as other ethnic minorities in the United States.

Another implication based on the study findings regarding health insurance has to do with the expansion of health insurance coverage under the ACA. Gaps in insurance coverage among racial and ethnic groups have been found to have narrowed extensively after implementation of the ACA coverage expansion policy (Ajay et al., 2019). However, these effects were most significant in states that expanded Medicaid, such as New York and California; Florida did not do so. One study showed that uninsured rates were roughly twice as high in non-expansion states in 2016. By comparison, uninsured rates for Black, non-Hispanic, and Hispanic lowest-income residents in California and New York were lower than those for all non-Hispanic Whites in Florida and Texas (Ajay

et al., 2019). Expansion of ACA coverage in Florida would likely improve access among different racial and ethnic groups, including ADAs, and reduce disparities.

Future Research

In future studies, multisite and multigeneration designs should be applied to increase the diversity and heterogeneity of the ADA sample. Such an approach will enhance generalizability while examining changes and differences between ADAs' health outcomes (e.g., HSU and medication adherence) and other ethnic groups. Most studies do not adequately represent diversity among ADAs, so that further research is required that pays special attention to diverse religions, countries of origin, and socioeconomic backgrounds.

Additionally, another area for future research involves study of the impact of perceived discrimination on medication adherence among ADAs. The underlying aspects of perceived discrimination toward the ADAs population are shared across ethnic minority groups in the United States, such as African Americans, Latino Americans, Native Americans, and Asian Americans. However, ADAs encounter a further unique level of discrimination, resulting from invisibility and invalidation of their racialized experience. The lack of racial/ethnic recognition results in a failure to collect health data on ADAs from hospital databases, population surveys, and other health records. Another unique factor related to ADAs' perceived discrimination is the hostile national context and invasive surveillance. ADAs were treated as hostile foreigners after the events of 9/11. The oppressive national responses following 9/11 can act as traumatic stressors for ADAs and place tremendous pressures on their communities (Awad et al., 2019). Further research could help explain a number of adverse factors, including perceived

discrimination, increased stress related to difficult life circumstances, and depressive symptoms among ADAs. As the population of ADAs in the United States continues to grow, there is an increased need for research that examines the role of ethnic/racial perceived discrimination in ADAs' health and health outcomes, particularly medication adherence and HSU.

Moreover, the study findings support the role of length of stay, place of birth, and parent place of birth within some of the results as significant predictors of HSU and medication adherence. These variables could indicate issues with acculturation or assimilation of ADAs. The perception of acculturation is complex and multifaceted, and it cannot be limited to a number of years, English proficiency, or nativity (Abboud et al., 2017; Yang & Hwang, 2016). In the research context, it is important to note that acculturation as a construct requires rigorous measures with which to capture all its dimensions. Hence further research could help expand knowledge about the role of acculturation on ADAs' HSU and medication adherence.

Further research directed toward better understanding the underlying reasons for the lack of health insurance among ADAs in South Florida is still needed. One contributing factor could be the persistence of public misconceptions surrounding health insurance coverage (Ajay et al., 2019). A recent study assessing demographic differences in ACA and health insurance knowledge in a multiethnic urban sample in Michigan revealed an association between lack of health insurance coverage and level of knowledge (Patel et al., 2020). The researchers found that ADAs in Michigan had high levels of coverage knowledge and were more likely to be aware that more people can get health insurance because of the ACA. The study was performed in Michigan, where

Arabic-speaking healthcare providers are readily available, as might not be the case in other states. In addition, a major Arab-serving organization received one of the most substantial ACA enrollment grants (Patel et al., 2020). As a result, there has been significant outreach by ADA groups in the region. Interventional community-based studies that focus on improving knowledge about health insurance and awareness of the enrollment process are needed among the ADA community in South Florida.

Limitations

The limitations of the study must be noted. A larger sample would have boosted the statistical power of the analyses conducted, but the sample size was sufficient based on the power analysis. However, ADA research sampling methods suffer from some challenges and limitations. First, regardless of the sampling method employed, ADA participants are characterized by mistrust that makes them unwilling to participate and increases their hesitancy because of concerns about being under surveillance and portrayed negatively (Kahan & Al-Tamimi, 2009). Second, sampling bias could affect the study sample, with ADAs' Internet sites, social media, and blogs best adapted for use by participants who have a strong Arab identity. In addition, an online self-administered survey method is biased toward reaching participants who are highly educated, younger, or highly acculturated/oriented toward U.S. culture (Amer & Awad, 2015; Amer & Hovey, 2012; Kahan & Al-Tamimi, 2009). Studies have found that older adults, in general, have the lowest adoption rates for new technologies, such as the Internet (Hargittai et al., 2019; Tsai et al., 2017). Third, the study questionnaires were employed only in the English language, so that a lack of proficiency in speaking English could be a relevant factor for sampling bias.

A fourth limitation of the present study is generalizability. The findings were specific to South Florida ADAs and are not generalizable to other ADA communities in the United States. Although rich narrative data were collected in the qualitative phase of the study, no generalizations can be made. For the quantitative phase, self-reported measures were employed, which may lead to biased estimates of the study findings, for the data were subject to the accuracy of memory and social desirability. Fifth, use of a cross-sectional design limits the ability to make inferences about causality. Sixth, although the present study included many factors outlined from ABM, certain constructs were not included that might have increased its explanatory power.

Seventh, sample homogeneity was also a limitation of the study. Most participants were young (18–29) and well educated, and almost all were Muslims. The inclusion of seven other religious affiliations limited the ability to fully explore whether religion drew on different rationales in constructing health outcomes (HSU and medication adherence).

Finally, the data lacked detailed information regarding medications. Half of participants were not on prescribed medications, which reduced the sample size for assessing medication adherence.

Conclusion

This study explored health literacy level and perceived discrimination and their effects on HSU and medication adherence outcomes of ADAs in South Florida. The mixed-method research approach employed provided useful methodological and feasibility evidence that proved critical in identifying, understanding, and explaining the questions explored in this dissertation. The limitations imposed by either qualitative or quantitative methods in uncovering relevant facts of interest to the study have been

avoided. Findings yielded by both approaches point to complex reasons underlying the pattern of HSU and medication adherence rate among ADAs in South Florida, while also the impact of health literacy level and perceived discrimination.

The results from the qualitative ethnographic focus groups helped in exploring factors that influenced study outcomes, including social, economic, and cultural factors. For instance, financial reasons, lack of health insurance coverage, health literacy barriers, perceived discrimination, and generational differences were some of the themes used to guide the quantitative study development so as to explore these dissertation concerns further. Quantitative findings highlighted the significant predictors and the magnitude of their effect. As already noted, better understanding of ADAs health should allow healthcare providers and pharmacists to discern these factors' impact on individuals' general health status and health outcomes, such as HSU and medication adherence.

The findings of this study, both qualitatively and quantitatively, yielded important and information relevant to the construction of epidemiological data for ADAs' health outcomes. In addition, the synergy resulting from the interplay of both data sources provides a novel contribution to current understandings of ADAs' health outcomes in the United States and advances the ongoing health and pharmacy research literature.

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Appendix A

NOVA SOUTHEASTERN UNIVERSITY
Institutional Review Board

MEMORANDUM

To: **Haifa Fadil, MS**

From: **William "Bill" R Wolowich, Pharm.D.,**
Center Representative, Institutional Review Board

Date: **April 12, 2018**

Re: **IRB #: 2018-188; Title, "A Qualitative Assessment of Health status of the Arab descent Community in South Florida"**

I have reviewed the above-referenced research protocol at the center level. Based on the information provided, I have determined that this study is exempt from further IRB review under **45 CFR 46.101(b) (Exempt Category 2)**. You may proceed with your study as described to the IRB. As principal investigator, you must adhere to the following requirements:

1) CONSENT: If recruitment procedures include consent forms, they must be obtained in such a manner that they are clearly understood by the subjects and the process affords subjects the opportunity to ask questions, obtain detailed answers from those directly involved in the research, and have sufficient time to consider their participation after they have been provided this information. The subjects must be given a copy of the signed consent document, and a copy must be placed in a secure file separate from de-identified participant information. Record of informed consent must be retained for a minimum of three years from the conclusion of the study.

2) ADVERSE EVENTS/UNANTICIPATED PROBLEMS: The principal investigator is required to notify the IRB chair and me (954-262-5369 and William "Bill" R Wolowich, Pharm.D., respectively) of any adverse reactions or unanticipated events that may develop as a result of this study. Reactions or events may include, but are not limited to, injury, depression as a result of

participation in the study, life-threatening situation, death, or loss of confidentiality/anonymity of subject. Approval may be withdrawn if the problem is serious.

3) AMENDMENTS: Any changes in the study (e.g., procedures, number or types of subjects, consent forms, investigators, etc.) must be approved by the IRB prior to implementation. Please be advised that changes in a study may require further review depending on the nature of the change. Please contact me with any questions regarding amendments or changes to your study.

The NSU IRB is in compliance with the requirements for the protection of human subjects prescribed in Part 46 of Title 45 of the Code of Federal Regulations (45 CFR 46) revised June 18, 1991.

Cc: Jesús Sánchez, PhD
William "Bill" R Wolowich, Pharm.D

Appendix B

Dependent and Independent Variables

Concept	Variables	**Indicators**	**Measures**
Predisposing factor (independent)	Age (years)	What is your age?	0= 18-29 1= 30-49 2= 50 and older
	Gender	Gender of respondent	0= Male 1= Female
	Education	What is the highest level of schooling you have completed?	0= High School and lower 1= College and higher
	Country of origin	What is your country of origin?	1= Egypt 2=Algeria 3= Iraq 4= Sudan 5= Morocco 6= Saudi Arabia 7= Yemen 8= Syria 9= Tunisia 10= Somalia 11= United Arab Emirates 12= Jordan 13= Libya 14= Palestine 15= Lebanon 16= Oman 17= Kuwait 18= Mauritania 19= Qatar 20= Bahrain 21= Djibouti 22= Comoros 23= Somalia
	Length of Stay	How many years have you been in the U.S.?	From 1 year to more than 35 years

Dependent and Independent Variables

Concept	Variables	**Indicators**	**Measures**
Predisposing factor (independent)	Place of birth	Is the U.S. your place of birth?	0= No 1= Yes
	Parent place of birth	Were your parents (or at least one of them) born in the U.S.?	0= No 1= Yes
	Relationship status	What is your legal marital status?	0= Single 1= Being in relationship/ Married
	Employment status	Which one of the following best describes your work situation in the past 30 days?	0= A student/ Unemployed 2= Occasional Work/ Part-Time Work (Less Than 30 Hours/Week)/ Self-employed 3- Regular Full-Time Work (30 or More Hours/Week)
	Religion status	What, if any, is your religious preference?	0= Muslim 1= Other affiliations
	Religious beliefs	Do you consider yourself to be religious?	0= A little religious 1= Somewhat religious 2= Deeply religious
	Refugee status	Do you consider yourself a refugee immigrant?	0= No 1= Yes
	Beliefs about medicines	Beliefs about Medicines Questionnaire (BMQ) General(Horne et al., 1999). Aggregate score from all 8 items.	1= Strongly disagree 2= Disagree 3= Uncertain 4= Agree 5= Strongly agree
Enabling factors (independent)	Income	How much total combined money did all members of your household earn in last year?	0= $0 - $39,999 1= $40,000 - $79,999 2= $80,000 or more
	Health insurance	In the past 12 months, where you covered at any time by health insurance or medical coverage?	0= No 1= Yes

Dependent and Independent Variables

Concept	Variables	**Indicators**	**Measures**
Enabling factors (independent)	Health literacy	The Newest Vital Sign (NVS) (Weiss et al., 2005) Aggregate score from all 6 items	0= score of 0 – 3 limited/ possibility of limited health literacy 1= score 4-6 adequate health literacy
		Chew's Set of Brief Screening Questions (SBSQ) Chew's Set of Brief Screening Questions (SBSQ)(Chew et al., 2008). Aggregate score from all 3 items	0= score of 3 – 12 limited/ possibility of limited health literacy 1= score of 13-15 adequate health literacy
	Perceived discrimination	Everyday Discrimination Scale (EDS)(Williams et al., 1997). Aggregate score from all 9 items	0= low 9-15 1= medium/ high 16-54
Need factors (independent)	Self-reported health conditions	Conditions was the sum of 20 possible serious health conditions and smoking	0= No 1= Yes
	Health-related quality of life	The 12-Item Short Form Health Survey Version 2 (SF-12v2). Aggregate score from all 12 items	1= All the time 2= Most of the time 3= Some of the time 4= A little of the time 5= None of the time
Healthcare services utilizations (Dependent)	Outpatient visits	In the past 12 months, how many visits did you make to a doctor or nurse practitioner for a physical health problem. Do not count times when you only picked up medication or when you saw a doctor when you were hospitalized	0= No 1= Yes
	Preventive care utilization	During the last 12 months, did you do any preventive cancer screening (i.e. a breast exam, a pap smear, a colorectal (colon)?	0= No 1= Yes

Dependent and Independent Variables

Concept	Variables	**Indicators**	**Measures**
Medication adherence (Dependent)	Medication adherence	Morisky Medication Adherence Scale (MMAS-8)(Morisky et al., 2008). Aggregate score from all 8 items	1= scores more than 7 for optimal adherence 0= scores equal or less than 7 for suboptimal adherents